July 17, 1962 R. D. RAYNOR 3,045,240

RABBIT EAR ANTENNA

Filed Nov. 12, 1959

3 Sheets-Sheet 1

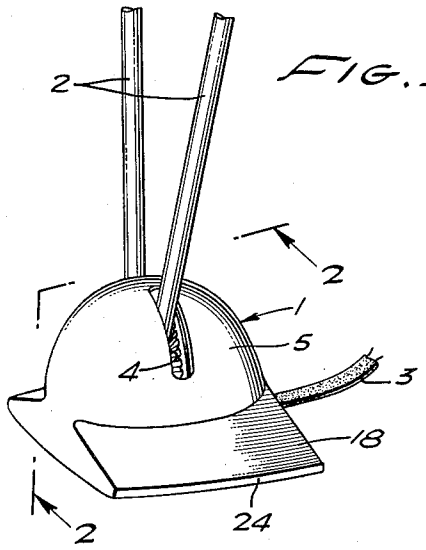

FIG. 1.

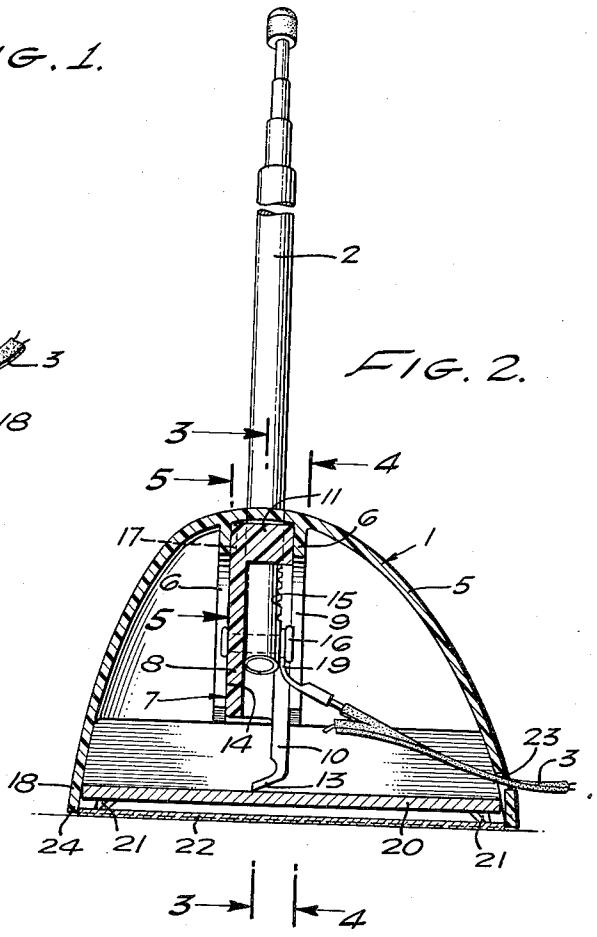

FIG. 2.

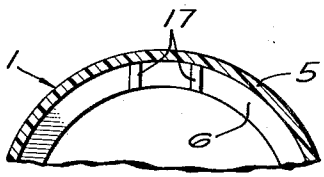

FIG. 5.

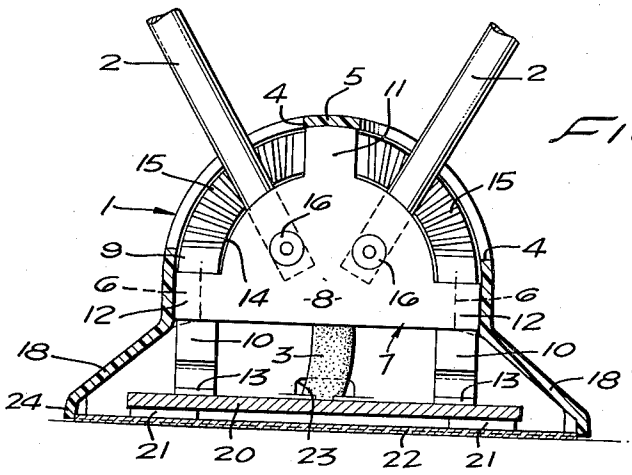

FIG. 3.

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3 Sheets-Sheet 2

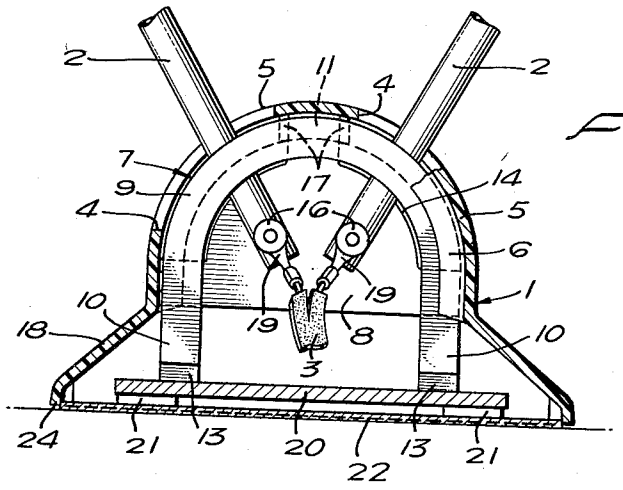


FIG. 4.

FIG. 6.

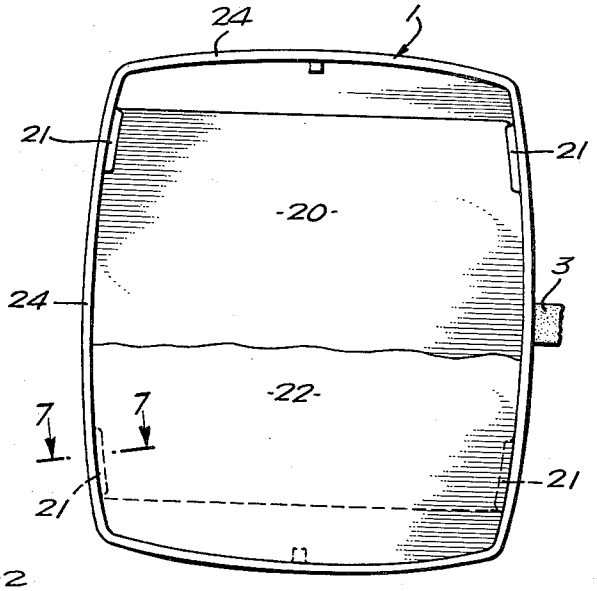


FIG. 7.

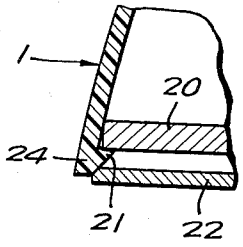
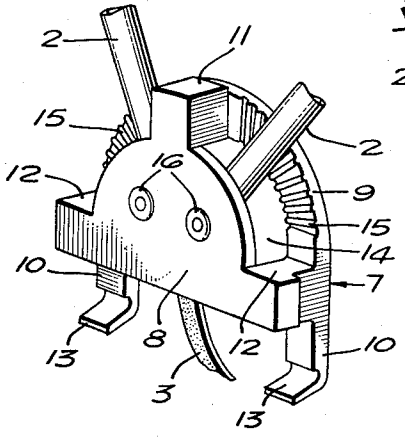


FIG. 8.



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3 Sheets-Sheet 3

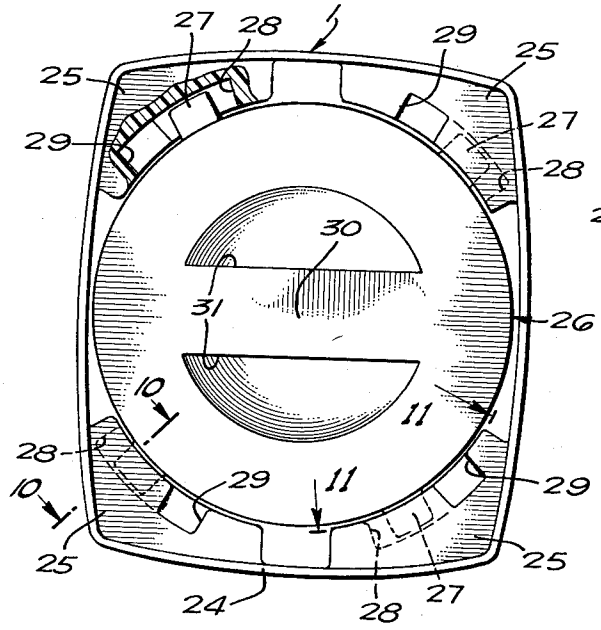

FIG. 9.

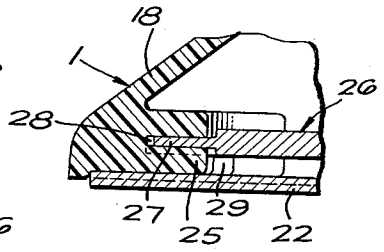

FIG. 10.

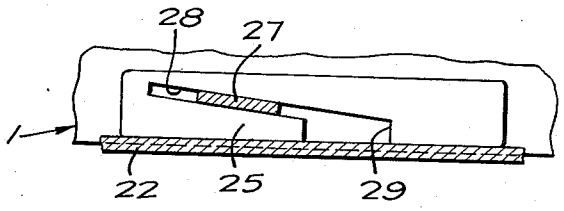

FIG. 11.

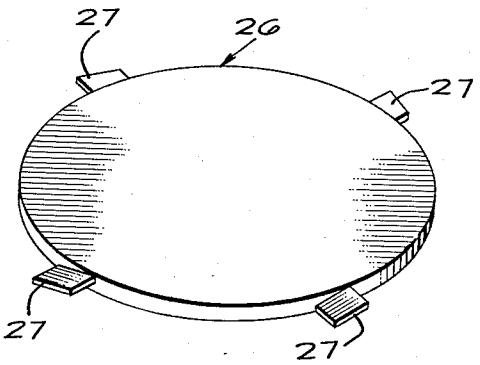

FIG. 12.

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3,045,240

RABBIT EAR ANTENNA

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Filed Nov. 12, 1959, Ser. No. 852,440
11 Claims. (Cl. 343—805)

This invention relates to an indoor television antenna and, more particularly, to an indoor antenna known in the trade as the "eight-ball" rabbit ear type.

In the prior art, the "eight-ball" shape housing of indoor antennas, having two dipoles extending upwardly and outwardly therefrom, were made of two half shells held together by at least one bolt. This type of antenna was extremely difficult to assemble in that the two half shells had to be held together, and the other members inserted therein and held in place, while the bolt was inserted between the two half shells. In addition, however, the bolt not only held the half shells together, but also held the other structure therein in place and this made the assembly even more difficult.

There have been other types of single shell indoor antennas in the art prior to the present invention, but these were not of the "eight-ball" shape, and, most important, they required relatively complicated nut and bolt arrangements to hold the parts in them and to hold the dipoles in proper adjustment.

The present invention has overcome the assembly problems of the prior art, firstly, by having the "eight-ball" shaped shell molded of plastic material, for example, in one piece. Secondly, the dipoles and cable terminals are held on a semicircular frame, generally made of plastic, and having legs which extend downwardly therefrom to be in contact with the base plate. The legs may have a resilient portion on the lower end thereof or the base plate may be adjusted so that in either event the legs will be in pressure contact with the base plate, and the upper end of the frame will be held in contact with the upper inner surface of the single shell. Thus, in assembling the present invention, the dipoles and the cable terminals, having been previously riveted to the frame, and the frame are inserted into a single shell member at the same time. The fact that the cable terminals are secured to the frame prior to assembly is of great importance because this permits all wiring for the antenna to be accomplished outside of the shell or housing.

The dipoles extend typically through the slots, and the base plate may be snapped into place into the open end inwardly of the resilient edges of the shell and held therein by detents. The base plate, thus, may be held downwardly by the springs formed on the frame legs and the frame, then, would be similarly held upwardly against the inner surface of the shell. The base plate may also be threadedly engaged by means of partial male threads on the plate with partial female threads adjacent the edges of the open end of the shell.

The present invention requires only one shell member whereas the prior art "eight-ball" shell requires two shell members. Thus, every time one shell member is molded in accordance with the manufacture of the present invention, the prior art requires two molding operations to make a typical "eight-ball," rabbit ear antenna. The present invention also eliminates a number of parts, including two holding pins within the shell, a nut and bolt extending from one side of the shell to the other, and a great amount of labor and time in the assembly.

It is therefore an object of the present invention to provide an improved indoor antenna.

It is a principal object of the present invention to provide an indoor antenna which permits unitized construction in the assembly thereof.

It is a further object of the present invention to provide an indoor antenna in which the dipoles and cable terminals are riveted to a frame and in which the frame, by means of spring action, holds the dipoles in place and holds the base plate in the bottom of the one-piece shell without an adjusting or tightening device, such as a nut and bolt.

The invention also comprises novel details of construction and novel combinations and arrangements of parts which will more fully appear in the course of the following description. However, the drawings merely show, and the following description merely describes, preferred embodiments of the present invention, which are given by way of illustration and example only.

In the drawings like reference characters designate similar parts in the several views:

FIG. 1 is a perspective view of the antenna mount according to the present invention;

FIG. 2 is a cross-sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken along the line 4—4 of FIG. 2;

FIG. 5 is a fragmentary cross-sectional view taken along the line 5—5 of FIG. 2;

FIG. 6 is a view of the external bottom of the antenna assembly;

FIG. 7 is a fragmentary view taken along the line 7—7 of FIG. 6;

FIG. 8 is a perspective view of the prefabricated dipole holding frame;

FIG. 9 is a bottom view of the interior of the antenna shell illustrating another embodiment of the invention;

FIG. 10 is a fragmentary view taken along the line 10—10 of FIG. 9;

FIG. 11 is a fragmentary view taken along the line 11—11 of FIG. 9; and

FIG. 12 is an upper perspective view of the embodiment of the base plate shown in FIG. 9.

Referring to FIGS. 1–8, the assembled indoor antenna is shown in a one-piece shell 1 which may be typically molded from plastic and which has an upper portion 5 of a general semi-spheroidal shape and which has a lower portion 18 extending downwardly and laterally therefrom so as to terminate in the edges 24 forming the open end. The upper portion 5 of the shell is generally convex and typically is referred to in the trade as an "eight-ball" antenna and in which the dipoles 2 are referred to as "rabbit ears." Also shown in FIG. 1 are the slots 4 in which the dipoles are pivotable in the various desired positions in order to obtain the best television reception. Connected to the dipoles is a typical television antenna cable 3. This type of cable has two eye terminals 19, each of which is held in abutment with a lower end of one of the dipoles 2 by means of rivets 16 on which the dipoles are pivoted. The rivets are secured in the front wall 8 of the dipole holder or frame 7 shown in perspective in FIG. 8.

Frame 7 has a back wall 9 which is held in a spaced relationship with the front wall 8 by means of the lower connecting blocks 12 and an upper connecting block 11. It should be noted that walls 8 and 9 may substantially exist in mutually exclusive horizontal areas. In the space between the walls 8 and 9 are slots 14 which extend between the blocks 11 and 12 on both sides of the center. The space 14 is smaller in width than the diameter of the dipoles so that the dipoles must be inserted therein at an angle and thus have a resulting snug fit against the inner side on the wall 8 and the inner side

on the wall 9. The serrations 15 are cut into the inner surface of the wall 9 on both sides of the block 11 and the dipoles may be held in position between two lands of the serrations. Since the entire frame 7 can be of a plastic material molded in one piece, the use of the serrations help prevent the loosening of the dipoles between the walls 8 and 9 which, dependent upon the thickness and the material used, will have some resilience. Extending downwardly from the wall 9 are the legs 10, said legs terminating in a transversely and downwardly directed resilient end portion 13 which take the form of spring feet.

Extending inwardly from the interior surface of the upper portion 5 of the shell 1 are two rib members 6 of substantial semicircular configuration and forming between them an inverted channel to receive the frame 7. When the frame 7 is inserted in the space between rib 6, the block 11 at the top of frame 7 makes contact with a portion of the inner top surface of shell 1. The frame may also be fitted into a space provided between the two transverse front rib projections 17, shown in FIGS. 2 and 5, for more positive alignment. Just prior to inserting the frame 7 into the shell 1, the dipoles 2, riveted to the frame, are extended through slots 4 where they remain and after frame 7 has been inserted into the shell between the aforesaid ribs, the cable 3, having its terminals 19 on rivets 16, is inserted into the slot 23 and the shell is then ready to receive the base plate 20.

The shell 1 is typically made of a flexible material so that the edges 24, around the bottom open end on which the detents 21 are formed, are flexible. Since they are flexible, the base plate 20 may be wider than the distance between each of the two opposite detents 21 so that plate 20 can be snapped therebetween with ease and so that plate 20 will be upwardly supported by the upper surface of detents 21. As may be best seen in FIG. 2, the plate 20 has been snapped into place and abuts the upper surface of the detents and also is in contact with the lower resilient portion 13 of the legs 10.

It can be clearly seen that this is a unique arrangement in comparison with the prior art antennas, which require two shells or other tightening devices, such as a nut and bolt, for assembly and to hold the structure together. Here, the spring member 13 acts in both directions so as to hold the upper block 11 of frame 7 in contact with the upper inner surface of the shell and so as to hold the base plate 20 in a spring biased relationship against the detents 21, while the spring action of the plate holds the elements erect.

After the base plate 20 is secured in place, a piece of felt 22 may be glued to the bottom of the structure by putting the glue either on the felt or the shell and then putting the shell into a brief pressure relationship with the felt with the glue therebetween. The felt remains on the shell and the completed assembly is ready for storage.

In FIGS. 9–12, another embodiment of the invention is shown, this embodiment being used where the foot 13 or the end of the leg 10 may not be resilient. In FIG. 9, showing a bottom view of the shell 1, extending inwardly from the corners of the lower edges 24 of the open end of the shell are corner members 25, which are shown in detail in FIGS. 10 and 11. Each corner member 25 has an opening 29 and extending inwardly from said opening is a threaded or helically shaped slot 28. Thus, base plate 26 with its partial male threads or helically directed tabs 27 may be moved into the bottom of the shell so that each tab moves into an opening 29 and then, when the plate 26 is rotated by means of handle 30, formed between the recesses 31, each tab 27 will be moved into a helical slot 28 to secure the base plate in the shell 1. This embodiment provides the advantage of adjustment in that the plate 26 can be rotated so that the partial threads 27 may be moved only a short distance into the slots 28, or all the way therein, thus moving the plate inwardly a greater distance toward the legs 10 of the frame 7. The extent of this inward movement is, of course, dependent upon the length of legs 10 and/or the extensions extending downwardly therefrom.

Another desirable way of securing a bottom plate, similar to plate 26, in the shell is to have it of rectangular shape so that the corners thereof could be rotated into the slots 28 in the same manner as the tabs 27. In other words, the rectangular corners would act as the tabs.

As may be seen, the present invention makes possible unitized construction with considerably less parts than required in the prior art and, by such novel construction, saves a great amount of frustrating labor time, as is required in the assembly of the typical two-shell eight ball antenna as used in the prior art.

Although the invention has been described and illustrated in detail, it is to be clearly understood that the same is by way of illustration and example only and is not to be taken by way of illustration, the spirit and scope of this invention being limited only by the terms of the appended claims.

What is claimed is:

1. In an indoor antenna assembly having two dipoles extending upwardly therefrom and frame means within a shell forming the exterior of the assembly, said dipoles being pivotally secured to said shell, the improvement comprising: said shell being of one piece having two slots therethrough, each of said slots extending from a position adjacent the top of said shell to a lower lateral position in said shell; said slots being in the same vertical planes and being horizontally aligned; one of said pivotally mounted dipoles extending outwardly of said shell through one of said slots; the other of said dipoles extending outwardly of said shell through the other of said slots; said shell having an open bottom; said frame being fitted in said shell between ribs extending inwardly from the inner surface of said shell; said frame having downward directed legs extending therefrom; each of said legs having a transverse resilient portion extending from the lower end thereof; a base plate fitted within said open bottom, detents extending inwardly from the edges adjacent said open bottom; said edges adjacent said bottom being resilient so as to permit portions of said base plate which are of greater width than the distance between said detents to be snapped into said open bottom and above the surface of said detents so as to be supported thereby, said transverse members on said legs being biased against said plate so as to hold said plate against said detents and so as to hold said frame member in contact with the upper interior surface of said shell.

2. In an indoor antenna assembly, a shell having an upper portion of general semi-spheroidal shape and having a lower portion extending downwardly therefrom, said assembly having two dipoles extending generally upwardly therefrom and a frame on which each of said dipoles is secured within the upper portion of said shell forming the upper exterior portion of said assembly, the improvement comprising: said shell being of one piece and forming the exterior of said assembly; said shell having two slots therethrough; each of said slots extending from a position adjacent the top of said shell to opposite lower side positions; one of said dipoles extending outwardly and generally upwardly from one of said slots; the other of said dipoles extending outwardly and generally upwardly from the other of said slots; said frame having a generally curved upper portion corresponding to the upper interior surface of said shell; said frame having downwardly directed legs; said shell having an open bottom; a base plate fitted within said open bottom so as to be adjacent the lower end of said legs; means in said shell adjacent said open bottom supporting said plate upwardly; and means on said plate engaged with said last-mentioned means to hold said plate in a pressure rela-

tionship with said legs and to hold the upper portion of said frame against the upper portion of the interior of said shell.

3. The invention according to claim 2 in which said frame is held in alignment between two ribs extending inwardly from the inner surface of said shell.

4. An antenna comprising: a frame including an approximately semi-circular front wall, an approximately semi-circular rear wall spaced rearwardly from said front wall, a first lower connecting block fixed to one side of said front wall and to an adjacent side of said rear wall, a second lower connecting block fixed to the other side of said front wall and to an adjacent side of said rear wall, an upper connecting block fixed to said front and rear walls at the tops thereof; a first straight tubular dipole element pivoted at one end on the front side of said rear wall, said first dipole element extending upwardly between said walls away from said upper connecting block above said pivoted end of said first dipole element; a second straight tubular dipole element pivoted at one end of the front side of said rear wall at a point spaced from the pivoted end of said first dipole element, said second dipole element extending upwardly between said walls away from said upper connecting block on one side thereof opposite the side on which said first dipole element is positioned, the space between said front and rear walls being less than the outside diameter of said dipole elements; and means to support said frame in an upright position.

5. The invention as defined in claim 4, wherein said front wall is serrated on its rearward side.

6. The invention as defined in claim 4, wherein the bottom edge of said front wall has a radius approximately equal to that of the top edge of said rear wall.

7. The invention as defined in claim 6, wherein said front wall is serrated on its rearward side.

8. In an indoor antenna assembly having the dipoles extending upwardly therefrom and frame means within a shell forming the exterior of the assembly, said dipoles being pivotally secured to said shell, the improvement comprising: said shell having two slots therethrough, each of said slots extending from a position adjacent the top of said shell to a lower lateral position in said shell; said slots being in the same vertical planes and being horizontally aligned; one of said pivotally mounted dipoles extending outwardly of said shell through one of said slots; the other of said dipoles extending outwardly of said shell through the other of said slots; said shell having an open bottom; said frame being fitted in contact with the internal surface of said shell between ribs extending inwardly from the inner surface of said shell to prevent rotation of said frame in said shell; and means including a base plate to hold said frame in a substantially fixed position in contact with the portion of said internal surface between said ribs.

9. An antenna comprising: a hollow cup-shaped shell having two holes at the top thereof; a frame in said shell positioned in contact with a portion of the internal surface thereof; a dipole pivoted to said frame in a position extending outwardly of each of said holes, said shell having internal projections adjacent said portion of said internal surface extending adjacent said frame to prevent rotation of said frame in said shell; and means including a base plate to hold said frame in a substantially fixed position in contact with said portion of said internal surface between said projections.

10. In an indoor antenna assembly, a shell having an upper portion of general semi-spheroidal shape and having a lower portion extending downwardly therefrom, said assembly having two dipoles extending generally upwardly therefrom and a frame on which each of said dipoles is secured within the upper portion of said shell forming the upper exterior portion of said assembly, the improvement comprising: said shell forming the exterior of said assembly; said shell having two slots therethrough; each of said slots extending from a position adjacent the top of said shell to opposite lower side positions; one of said dipoles extending outwardly and generally upwardly from one of said slots; the other of said dipoles extending outwardly and generally upwardly from the other of said slots; said frame having downwardly directed legs; said shell having an open bottom; a base plate fitted across said open bottom so as to be adjacent the lower end of said legs; means on said shell adjacent said open bottom supporting said plate upwardly; and means on said plate engaged with said last-mentioned means to hold said plate against said legs.

11. In an indoor antenna assembly, a shell having an upper portion of general semi-spheroidal shape and having a lower portion extending downwardly therefrom, said assembly having two dipoles extending generally upwardly therefrom and a frame on which each of said dipoles is secured within the upper portion of said shell forming the upper exterior portion of said assembly, the improvement comprising: said shell forming the exterior of said assembly; said shell having two slots therethrough; each of said slots extending from a position adjacent the top of said shell to opposite lower side positions; one of said dipoles extending outwardly and generally upwardly from one of said slots; the other of said dipoles extending outwardly and generally upwardly from the other of said slots; said frame having downwardly directed legs; said shell having an open bottom; a base plate fitted across said open bottom so as to be adjacent the lower end of said legs; means on said shell adjacent said open bottom supporting said plate upwardly; and means on said plate engaged with said last-mentioned means to hold said plate against said legs, said legs of said frame having resilient feet at their lower ends bearing against said plate.

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