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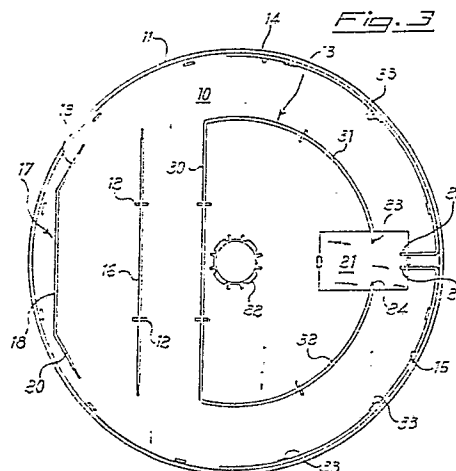
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## 54 Television antenna for interiors.

57 A TV antenna for interiors comprises a housing of flattened cylindrical shape, in a dielectric material, which is rotatably mounted on a base, also preferably of cylindrical flattened shape. Said housing contains a first dipole, of bent configuration, for the UHF band; a second dipole for the VHF band, also functioning as reflector element for UHF band; two or more director elements and preferably an amplifier circuit connected with the dipoles.



## Description

### TELEVISION ANTENNA FOR INTERIORS

The present invention relates to a television antenna to be used near a TV receiver, commonly known as antenna for interiors.

These interior antennas are used not only whenever the installation of an antenna at the outside is difficult or costly, but also systematically, together with a possible outside antenna (centralized or not) to allow a great number of local or regional TV transmitting stations to be received, for which the installation of corresponding antennas at the outside would not be convenient.

In fact, a satisfactory reception can be obtained for these various transmitters which, at least locally, have a signal comparable with that of the national transmitters, by making use of amplified antennas at the inside, of the wide band-type, possibly adapted to be oriented by hand or remote control.

The features of the signals at the inside of closed environments are, under various viewpoints, different from those usually detectable at open places, the most apparent difference being the intensity of the signals which is appreciably less.

Generally speaking the reception of the signals by means of antennas for interiors involves some technical problems which do not depend only on the lower intensity of the available signal. Important factors which also render the signal reception more difficult derive from the direction from which the signals arrive: in fact, at open places, the electromagnetic radiation is generally received directly or through one reflection, whereas at the inside of a building many reflections are generated due to obstacles and walls encountered.

Additional problems derive from the considerable extension of the frequency band used for television transmissions and the different reflective characteristics of the electromagnetic waves according to the wavelength. Also to be considered are difficulties deriving from the high number of transmitting stations positioned at different places, different distances and irradiating signals with different powers.

Furthermore, an antenna for interiors is subject to additional limitations (in comparison with the outside antennas) as far as its orientation and also its size are concerned, as well as for the aesthetical configuration which has to be acceptable even if it has to satisfy technical requirements. These latter limitations are in fact extremely strict conditions as to the results which can be obtained with the antennas for interiors.

In the light of the foregoing, the inside antennas already known are not satisfactory mainly under the aspects of overall size and aesthetical acceptability, as these two aspects are usually given up in view of the reception quality.

Object of the present invention is therefore to overcome the above-indicated inconveniences and in particular by providing an efficient TV antenna for interiors which will occupy a very limited room and at the same time will be of an aesthetically pleasant

shape, so as not to negatively interfere with the remainder of the environment.

This object is achieved through the invention consisting of a TV antenna for interiors, of the type comprising a housing of dielectric material rotatably mounted on a base, characterized in that said housing has a flattened cylindrical shape and comprises therein:

- A first dipole which is bent for the UHF band;
- A second dipole for the VHF band, having also the function of a reflecting element for the UHF band; and

- Two or more director elements.

These dipoles and director elements are advantageously provided by elongated metal bodies, which are bound to the housing inner surface by means of a multiplicity of spring fasteners. Furthermore, that first dipole is formed as a rectilinear length with two arcs of circumference and said second dipole-reflector is formed as two arcs of circumference having a radius which is substantially the same as the one of the flattened cylindrical housing.

Still advantageously the antenna according to the invention comprises a rectilinear reflecting element parallel to the rectilinear length of said first dipole and a director element comprising a rectilinear portion and two sections inwardly directed at an angle, with the rectilinear portion also parallel to the rectilinear length of said first dipole.

The invention will be now described with reference to the drawings in which:

Fig. 1 is a lateral view from the rear side of the TV antenna for interiors according to the invention;

Fig. 2 shows a diametral cross-section of the antenna according to the invention;

Fig. 3 is an underneath view of the upper housing of the antenna; and

Fig. 4 is a top plan view of the housing which forms the base of the antenna according to the invention.

Fig. 1 particularly shows the outer aspect of the antenna according to the invention, which appears to be formed of two superimposed bodies or housings of flattened cylindrical shape, designated with numeral references 1, 2.

These housings are made of a dielectric material, preferably a suitably moulded plastic material. The upper housing 1 contains at the inside the antenna components, while the lower housing 2 provides the base about which the housing 1 can be rotated for a correct orientation, and bears the antenna jacks 3 and 4, as well as the controls 5 and 6.

The rotation can occur manually or be performed by means of an electric motor with remote control as it is known and here not further described. Rubber feet 27 allow the antenna to rest on a plane, such as the upper plane of the television set, and provide for the necessary friction to prevent it from skidding.

The inner structure of the antenna will now be illustrated with reference to Figs. 2 and 3. The upper

housing 1 comprises a disc-shaped bottom portion 10 and a cylindrical side wall 11. Spring fasteners 12 are provided on the bottom portion 10 and are integrally with the housing during its moulding, which have the function of blocking by elastic deformation the elongated metal bodies or conductor wires forming the signal picking up elements. As can be seen in Fig. 2 these fasteners are formed as tabs vertically projecting from plane 10 and provided with an elastically deformable through hole. Other fasteners 33 are also provided, being formed with an elastically deformable tab projecting near the side wall 11.

A hub 22 protrudes from the center of disc 10 and engages for rotation in a support 29 provided in the base housing 2. At a central position, about the hub 22, there is placed a first dipole 13, of bent type, comprising a rectilinear length 30 and two arcs of circumference 31 and 32.

The ends of arcs 31 and 32 are the dipole terminals and are connected with the amplifier 21, operating in all the TV bands which is fixed at the inside of housing 1. Amplifier 21 is particularly studied to adapt the characteristic impedances of the two UHF and VHF dipoles to the receiver impedance. Furthermore, it has such a noise figure as to allow very weak signals to be received, as well as signals from a number of transmitter stations with signal levels extremely varying from one another.

The dipole 13 is useful for receiving the UHF band extending between 470 and 862 MHz and is subdivided in the channels from 21 to 69.

Within the housing there is also provided a second dipole, of open configuration, comprising two portions of circumference arc 14 and 15, with a radius which is substantially the same as that of the housing 1, positioned by means of fasteners 33. The ends 25 and 26 being the terminals of the dipole (nearer ends) are connected to the amplifier 21. This dipole is also useful for receiving signals in the VHF band (frequencies from 52,5 MHz to 230 MHz, channels from A to H). The arcs of circumference 14 and 15 of the second dipole, as clearly shown in Fig. 3, are placed concentrically with respect to the arcs of circumference 31 and 32 of the first dipole.

Furthermore, according to the invention, in order to reduce the physical size of the antenna and increase its directivity, the second dipole 14-15 is constructed so as to function at the same time as reflector for the signals of UHF band. It is thus possible to obtain a good power gain in all the bands with only one antenna having a dual receiving configuration.

The antenna also comprises two director elements, respectively 16 and 17. The director 16 is rectilinear and positioned parallel to the rectilinear length 30 of the first dipole. The director 17 comprises a rectilinear length 18 and two sections 19 and 20, also rectilinear, forming an angle so as to extend the size of the director without exceeding the housing contour. The directors may also be provided in a different number.

It is clear that the dipoles and the directors can advantageously be formed through suitable deformations of metal conductors, being coated or not

with an insulating layer.

Finally in Fig. 4 the plan view of the base housing 2 is shown, comprising a circular plate 7 and a double cylindrical wall 8-9, the upper portion of which has the function of a guide for the rotation of housing 1, which is pivotally mounted by means of the hub 22 and the support 29, with respect to housing 2. This latter has the already indicated portions 3-6, as well as the feet 27 for supporting the antenna.

## Claims

1. TV antenna for interiors, of the type comprising a housing of dielectric material rotatably mounted on a base, characterized in that said housing (1) has a flattened cylindrical shape and comprises at the inside:

- a first bent dipole (13) for the UHF band;
- a second dipole (14, 15) for the VHF band, also functioning as reflector element for UHF band; and
- two or more director elements (16, 17).

2. TV antenna according to claim 1, characterized by the fact of further comprising an amplifier circuit (21) which is connected with said dipoles (13; 14, 15).

3. TV antenna according to claim 1 or 2, characterized in that said dipoles (13; 14, 15) and director elements (16, 17) are formed as elongated metal bodies connected to the inner surface of said housing by means of a multiplicity of spring fasteners (12, 33).

4. TV antenna according to claim 1, characterized in that said elongated bodies have a substantially rounded cross-section and the fasteners (12, 33) are integrally formed with housing (1) during moulding of the latter.

5. TV antenna according to claim 4, characterized in that said first dipole (13) comprises a rectilinear section (30) and two arcs of circumference (31, 32) the ends of which provide the dipole terminals.

6. TV antenna according to claim 4, characterized in that said second dipole-reflector (14, 15) comprises two arcs of circumference having substantially the same radius as the one of the flattened cylindrical housing (1) and nearer ends (25, 26) forming the dipole terminals.

7. TV antenna according to claim 4, characterized by comprising a rectilinear reflector element (16).

8. TV antenna according to claim 7, characterized in that said rectilinear element (16) is parallel to the rectilinear portion (30) of said first dipole.

9. TV antenna according to claim 4, characterized by comprising a director element (17) formed by a rectilinear portion (18) and two sections (19, 20) inwardly directed at an angle.

10. TV antenna according to claim 9, characterized in that said rectilinear portion (18) is parallel to the rectilinear section (30) of said first dipole.

11. TV antenna according to whichever combination of claims 4-10.

12. TV Antenna according to claim 11, characterized in that said housing (1) comprises a central hub (22) for the rotation and said first dipole (13) is positioned about said hub (22).

13. TV antenna according to claim 12, characterized in that the arcs (31, 32; 14, 15) of said two dipoles are concentric and the amplifier (21) which is connected to both dipoles is positioned at the ends of the dipoles.

14. TV antenna according to claim 13, characterized in that the antenna base is shaped as a

second housing (2) of a flattened cylindrical shape and the same diameter as that of housing (1) which includes dipoles (13; 14, 15) and reflectors (16, 17) and is at a lower position with respect to the latter.

15. TV Antenna according to claim 14, characterized in that the base housing (2) is provided with a central support (29) for rotatably mounting the hub (22) of the upper housing (1).

16. TV antenna according to claim 15, characterized in that the base housing (2) bears the antenna jacks (3, 4) and the controls (5, 6) for controlling the antenna.

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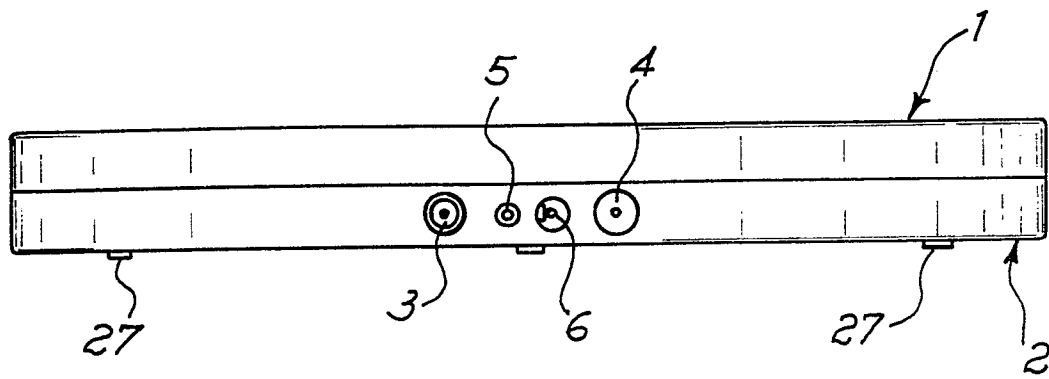
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*Fig. 1*



*Fig. 4*

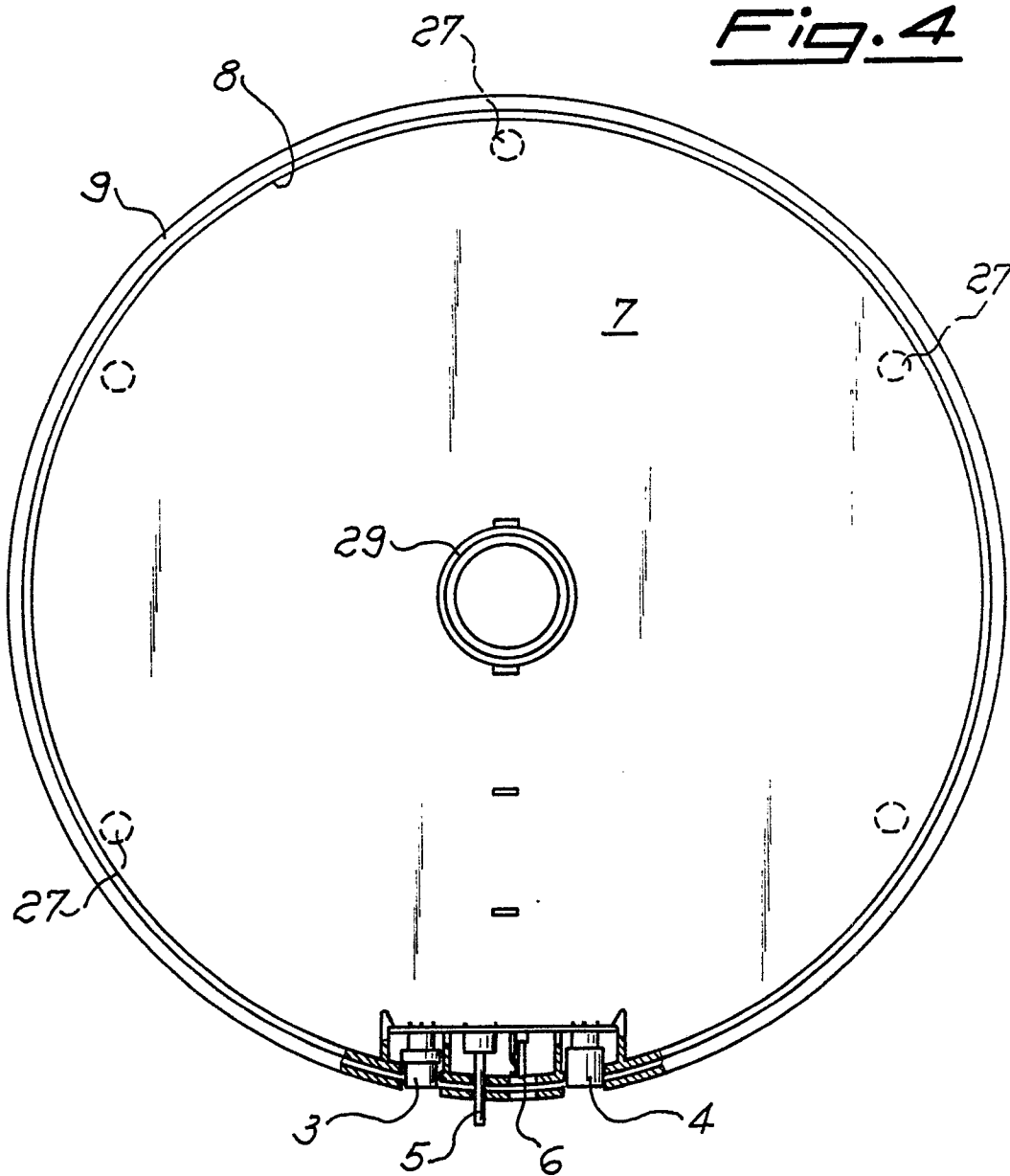


Fig. 2

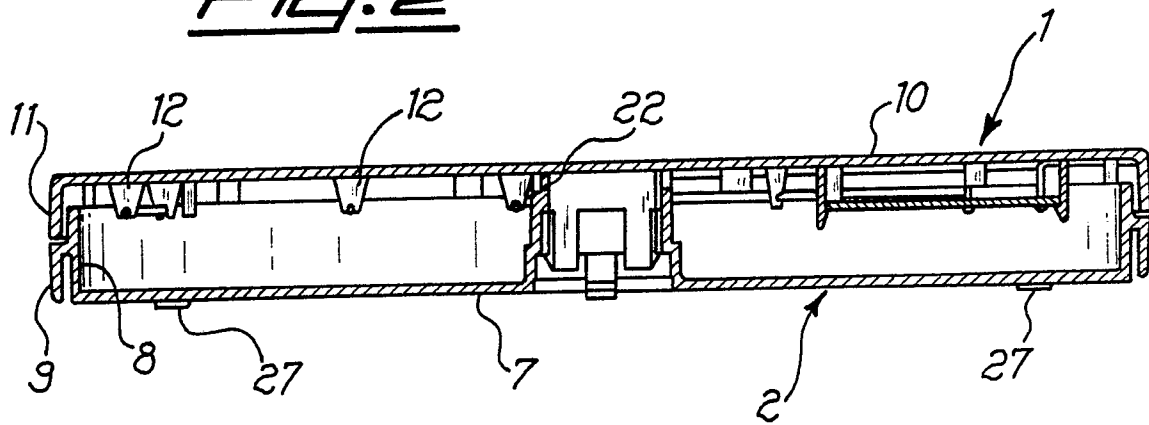


Fig. 3

