Dec. 30, 1969 A. R. BOOKER 3,487,414

OMNIDIRECTIONAL ANTENNA

Filed July 19, 1967

FIG. 1.

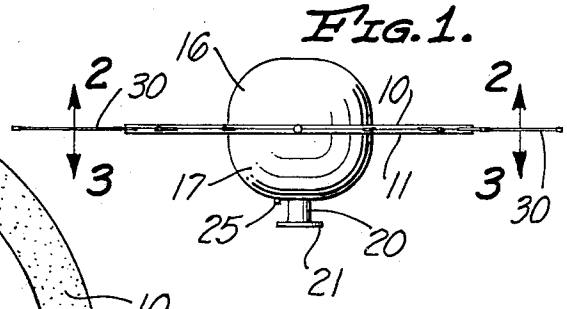


FIG. 2.

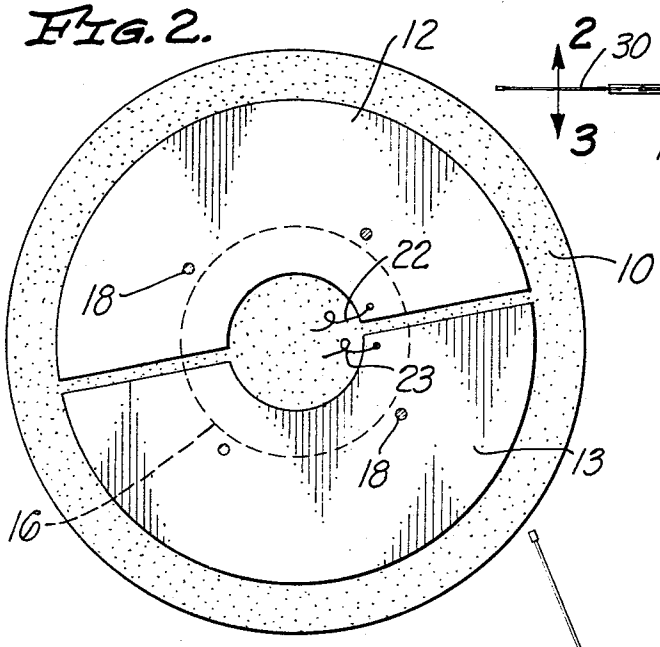


FIG. 3.

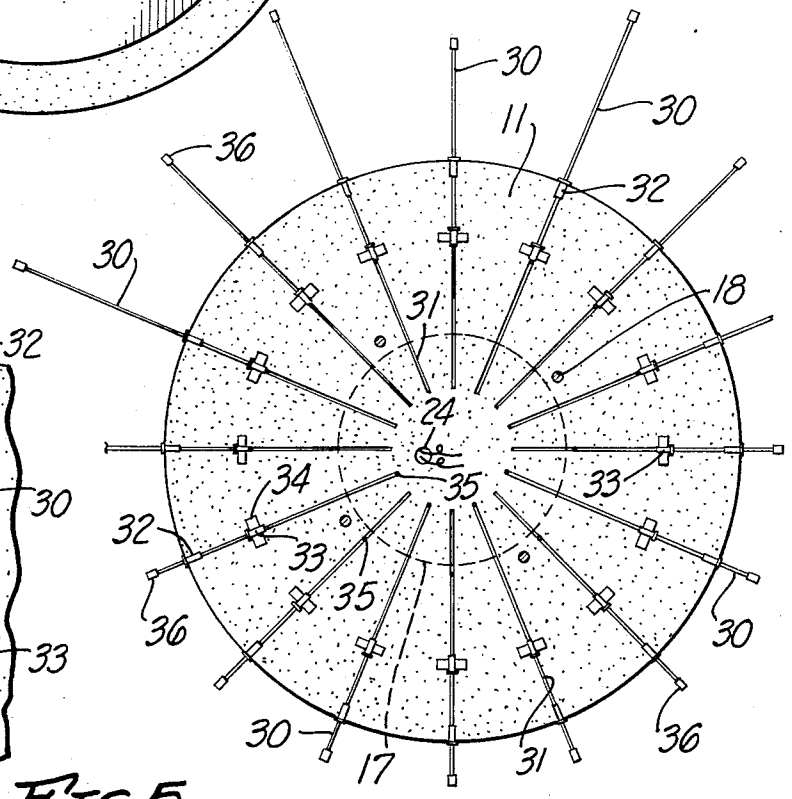


FIG. 4.

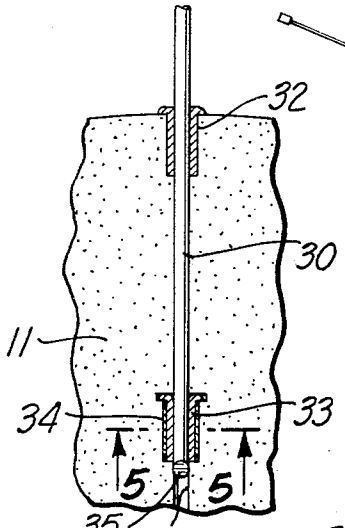
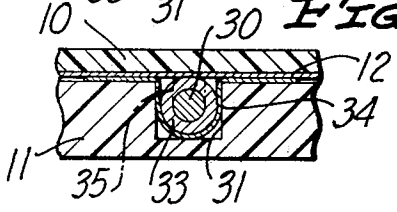


FIG. 5.



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OMNIDIRECTIONAL ANTENNA

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U.S. Cl. 343—793 8 Claims

ABSTRACT OF THE DISCLOSURE

An omnidirectional antenna particularly suited for use with television receivers on boats. A laminated construction comprising a pair of electrical insulating discs with two semiannular pieces of metal foil mounted on one disc and a plurality of radially projecting metal rods carried in the other disc and electrically connected to the overlying foil, with the rods radially slidable. Means for mounting the structure in the horizontal position and means for connecting the metal foil to a receiver input line.

This invention relates to antennas and, in particular, to a new and improved omnidirectional antenna particularly suited for use with television receivers in boats.

A boat underway makes numerous changes in heading and the conventional directional television antenna does not give good reception. It is an object of the present invention to provide a new and improved antenna which will have an omnidirectional characteristic. A further object is to provide such an antenna which is suitable for use over the range of channels 2 through 13 and in the UHF channels.

It is an object of the invention to provide a new and improved omnidirectional antenna which is simple and inexpensive to manufacture and which is rugged and durable. A further object is to provide such an antenna which is readily installed on boats and one which is unobstrusive in appearance.

It is a particular object of the invention to provide an omnidirectional antenna including a horizontally disposed electrically nonconducting plate and a pair of semiannular electrical conducting plates mounted on the nonconducting plate, together with circuit means for connecting the conducting plates to a receiver input line and mounting means for attaching the structure spaced from a support surface. A further object is to provide such an antenna including a plurality of electrical conducting rods carried thereon and projecting radially therefrom, with one group of rods connected to one conducting plate and another group of rods connected to another conducting plate.

It is a particular object to provide a new and improved laminated construction for an omnidirectional antenna. A further object is to provide such an antenna wherein the radial rods are slidable between retracted and extended positions. An additional object is to provide a specific construction wherein alternate rods have different lengths, providing improved reception over a wide frequency range.

Other objects, advantages, features and results will more fully appear in the course of the following description. The drawing merely shows and the description merely describes a preferred embodiment of the present invention which is given by way of illustration or example.

In the drawing:

FIG. 1 is a side view of the preferred embodiment of the invention;

FIG. 2 is an enlarged sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is an enlarged partial view similar to that of FIG. 3 showing the rod installation in greater detail; and

FIG. 5 is a partial sectional view taken along the line 5—5 of FIG. 4.

The structure of the drawing includes an upper plate member **10** and a lower plate member **11** which are joined together with foil sheets **12, 13** therebetween. The upper and lower members **10, 11** are of electrical nonconducting material and typically may be plastic discs. The foil sheets **12, 13** typically may be die cut of aluminum, copper or tin, with an adhesive on one face for attaching the foil sheets to the plate member **10**. The plate members may be joined together in a sandwich construction as illustrated in FIG. 1, by means of an adhesive or by means of screws or other suitable fastening means.

Upper and lower canopies **16, 17** typically of molded plastic, may be attached by screws **18**. A mounting post **20** has an upper flange (not shown) for fastening to the lower plate member and a lower flange **21** for mounting the antenna on any suitable support surface. Electrical conductors **22, 23** are fastened to the sheets **12, 13**, respectively, pass through an opening **24** in the lower plate member **21** and terminate at a connector **25** carried on the lower canopy **17**, for connecting the antenna to a receiver input line or the like. Where the canopy **17** is not utilized, the connector **25** may be mounted directly on the lower plate member. Of course, a long length of cable can be utilized in place of a connector if desired.

The electrical conducting sheets **12, 13** may be cut from a square or round piece of foil and preferably have a semiannular outline, such as the outline shown in FIG. 2. The two sheets are mounted on the plate member **10**, thus lying in a plane parallel to that of the plate members, with the two sheets spaced slightly apart to provide electrical insulation therebetween. Typically 0.002 inch thick aluminum foil with a self-adhesive coating on one surface is utilized.

A plurality of radially extending rods **30** is carried in the lower plate member **11**. In the specific embodiment illustrated, sixteen uniformly spaced rods are utilized, with eight rods contacting the sheet **12** and eight rods contacting the sheet **13**. The invention is not limited to sixteen rods and other quantities may be selected. Antennas with eight rods and with twenty rods have been operated satisfactorily. The rods may be positioned in grooves **31** in the plate member and preferably are slidable between a retracted position as illustrated in the lower portion of FIG. 3 and an extended position as illustrated in the upper portion of FIG. 3. The rods may be retracted or removed for shipping and storage and for clearance when the antenna is not in use. The rods preferably are extended when the antenna is being used for receiving signals.

In the preferred embodiment illustrated, the alternate rods are of different length providing improved wide frequency band reception while maintaining the omnidirectional characteristic of the antenna. In a specific unit now on the market for operation over channels 2–13 and the UHF channels, the plate members **10, 11** are 23 inches diameter, and the foil sheets **12, 13** have an outside diameter of 19 inches and and inside diameter of 6 inches, with the shorter rods extending eight inches and the longer rods extending twelve inches from the periphery of the plate members.

A preferred arrangement for the rod installation is illustrated in FIGS. 4 and 5. A sleeve or eyelet **32** is positioned in the groove **31** adjacent the periphery of the plate member **11**. Another sleeve **33** is positioned in the groove **31** located inwardly from the sleeve **32**. The rod **30** slides in the two sleeves **32, 33**. The sleeve **33** is of electrical conducting material and a ribbon **34** of electrical conducting

material is disposed in the groove **31** about the sleeve **33** with the ends of the ribbon **34** extending across the inner surface of the plate member **11** for electrical contact with the superposed foil sheet. An upturned portion **35** may be provided at the inner end of the rod for engaging the sleeve **33** and limiting outward movement of the rod. A soft plastic cap **36** may be provided over the outer end of the rod for protective and decorative purposes.

Although an exemplary embodiment of the invention has been disclosed and discussed, it will be understood that other applications of the invention are possible and that the embodiment disclosed may be subjected to various changes, modifications and substitutions without necessarily departing from the spirit of the invention.

I claim as my invention:

1. An omnidirectional antenna for a television receiver comprising in combination:

a first horizontally disposed electrically non-conducting plate;

second third semiannular electrical conducting plates mounted on said first plate in opposed orientation and parallel to said first plate;

a plurality of electrical conducting rods carried by said first plate and projecting radially therefrom, with one group of said rods electrically connected to said second plate and another group of said rods electrically connected to said third plate;

circuit means for connecting said second plate to one conductor of a receiver input line and for connecting said third plate to the other conductor of a receiver input line; and

mounting means attahced to said first plate for supporting same spaced from a support surface.

2. An antenna as defined in claim **1** with the rods of a group of two alternating lengths.

3. An antenna as defined in claim **1** with said rods slidably mounted in said first plate for movement between a first retracted position and a second extended position.

4. An antenna as defined in claim **3** in which said first plate includes a rod groove for a rod, a guide sleeve in the groove for slidably receiving a rod, and an electrical conductor interconnecting the sleeve and a conducting plate.

5. An antenna as defined in claim **1** in which said second and third plates comprise semicircular sheets arranged in circular spaced relation in a plane.

6. An antenna as defined in claim **1** in which said first plate includes upper and lower members, with said second and third plates affixed to the inner surface of one of said members in a sandwich arrangement.

7. An antenna as defined in claim **6** in which the other of said members includes a plurality of radial grooves in the inner surface thereof, and with said electrical conducting rods disposed in said grooves and projecting from said first plate.

8. An antenna as defined in claim **7** in which said rods are slidable in said grooves for movement between a first retracted position and a second extended position.

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U.S. Cl. X.R.

343—725, 796, 799, 810

(5/69) UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,487,414 Dated December 30, 1969

Inventor(s) Aylwin R. Booker

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, Claim 1, Line 20 "and" should be inserted between the words "second" and "third"
Claim 1, line 5 of amendment dated June 17, 1969;
Line 32 "attahced" should read --attached--
Claim 1, line 17 of amendment dated June 17, 1969.

SIGNED AND
SEALED
JUL 21 1970

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents