Feb. 3, 1959 J. J. BRAUND 2,872,678

COMBINED GEOGRAPHICAL GLOBE AND ANTENNA STRUCTURE

Filed Aug. 31, 1956 2 Sheets-Sheet 1

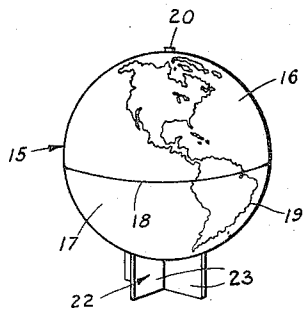


Fig. 1

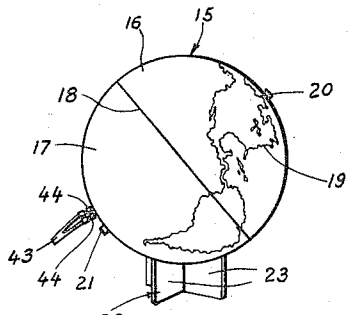


Fig. 2

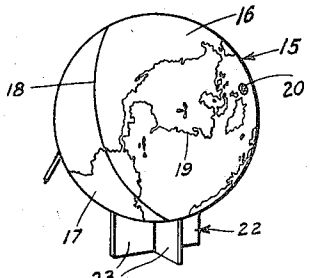


Fig. 3

Fig. 4

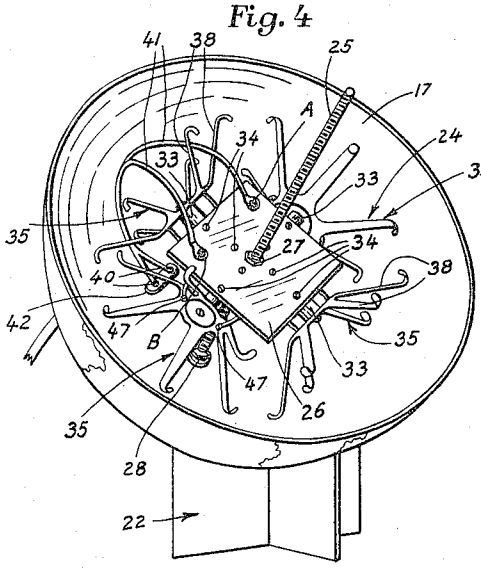


Fig. 5

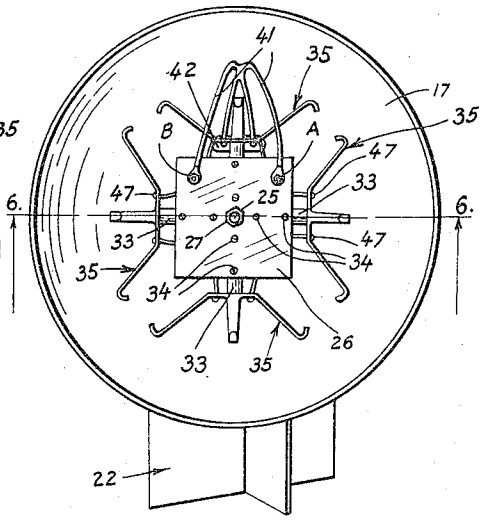


Fig. 7

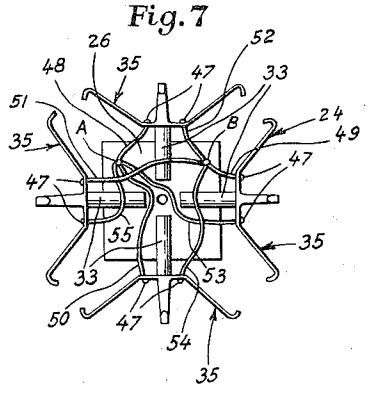
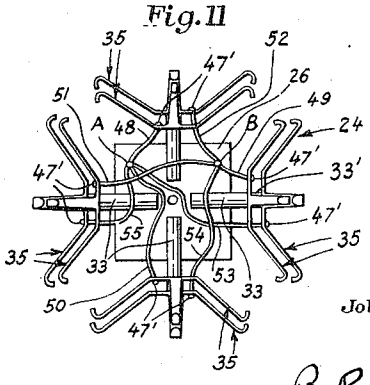


Fig. 11



INVENTOR
John J. Braund

BY B. P. Fishburne, Jr.

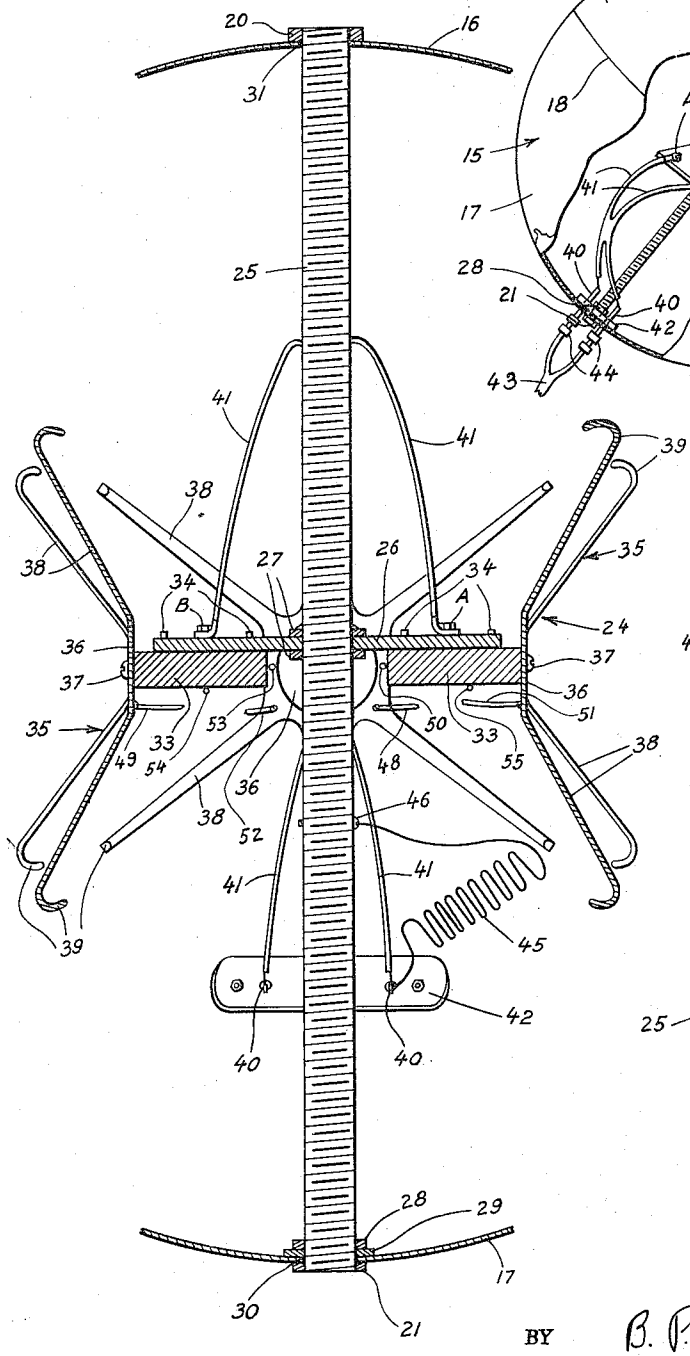
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COMBINED GEOGRAPHICAL GLOBE AND ANTENNA STRUCTURE

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Fig. 6



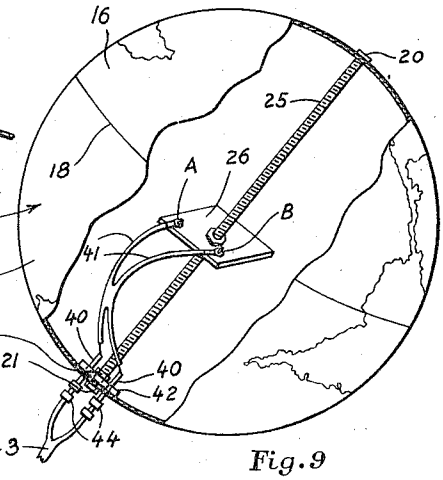


Fig. 9

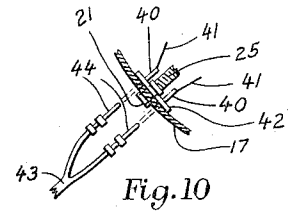
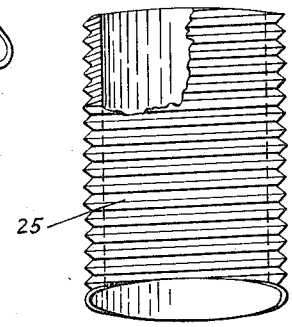


Fig. 10

Fig. 8



INVENTOR

John J. Braund

BY B. P. Fishburne, Jr.

ATTORNEY

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COMBINED GEOGRAPHICAL GLOBE AND ANTENNA STRUCTURE

John J. Braund, Washington, D. C.

Application August 31, 1956, Serial No. 607,405

9 Claims. (Cl. 343—720)

The present invention relates to antenna structure, particularly for use with television receivers.

A primary object of the invention is to provide a television antenna of the indoor type which will possess the major advantages of expensive adjustable or rotary types of outdoor antennas, but which is simplified in construction and highly inexpensive to manufacture.

Another object of the invention is to provide an indoor television antenna mounted for universal adjustment relative to the incoming signal in a highly novel and convenient manner.

Another object is to provide an antenna which is mounted within and concealed by a hollow spherical globe, which may be a geographical globe, the globe being removably mounted upon a simplified stand or base adapted to support the globe and antenna in any adjusted position.

Another object is to provide a combined geographical globe and television antenna which may be fully utilized as a globe for educational purposes, or the like, the construction forming an ideal mounting for the concealed antenna and rendering the same adjustable in all directions, the combination forming a highly attractive and ornamental accessory for the interior of the house.

Another object is to provide a combined antenna and geographical globe, wherein the geographical indicia on the globe may be utilized in conjunction with a plug-in connection of the globe to enable the user of the device to know at a glance the position or orientation of the antenna structure concealed within the globe.

Another object is to provide highly simplified and efficient radio wave antenna structure for use within a geographical globe, and including novel and simplified mechanical means for mounting the antenna structure inside of the globe.

Still another object is to provide an improved television antenna of the above-mentioned character which is easy to use or operate by following a minimum number of simplified instructions.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figures 1, 2 and 3 are side elevational views, partly diagrammatic, on a greatly reduced scale, showing the combined antenna and globe of the present invention in several different adjusted positions.

Figure 4 is an enlarged perspective view of the antenna and globe as positioned in Figure 3 with the top half of the globe removed.

Figure 5 is a similar view taken at right angles or normal to the diametrical plane through the globe and antenna where the two globe sections are joined.

Figure 6 is an enlarged central horizontal section taken on line 6—6 of Figure 5, partly broken away.

Figure 7 is a side elevational view of the antenna structure bodily removed from the globe and supporting rod and showing particularly the wiring of the antenna.

Figure 8 is a fragmentary side elevation partly in section of a screw-threaded tubular member employed to mount the antenna structure bodily within the geographical globe.

Figure 9 is a perspective view, partly diagrammatic, of the mechanical mounting or supporting means for the antenna structure within the globe and showing a plug-in arrangement, main electrical terminals and associated elements for the anntenna cable which leads to the television receiver, the remainder of the antenna structure being omitted for the purpose of simplification and the globe being partly broken away.

Figure 10 is a fragmentary exploded elevational view, partly in section, of the antenna cable plugs and plug jacks or sockets, and associated elements.

Figure 11 is a side elevational view of a slightly modified form of antenna structure for use within the globe.

Referring to the drawings, with particular attention to Figures 1 to 10 inclusive, the numeral 15 designates generally a hollow geographical globe, preferably formed of cardboard or paper, and comprising a pair of companion hemispherical globe sections 16 and 17 having meeting circumferential edges 18, representing the equator when the globe 15 is assembled. The globe 15 contains upon its outer surface the usual geographical indicia or maps 19, applied thereto by any conventional means and oriented properly and accurately with respect to the equator 18 and to north and south pole designating elements or nuts 20 and 21 to be described.

The assembled globe and antenna of Figures 1 to 3 is removably cradled or mounted upon a base or stand 22, conveniently constructed from a pair of crossed and interconnected slotted plates 23 having their top edges circularly curved to conform to the exterior curvature of the spherical globe 15. The plates 23 are identical in construction, and may be conveniently formed from wood, plastic or the like. In assembly, the plates 23 extend at right angles to each other and provide at their tops a spherical recess or seat for the globe 15. The plates 23 of base 22 are readily separable for convenience in packaging or shipment. The globe 15 containing the antenna structure rests bodily upon the base 22, which forms the sole support for the globe and antenna. The globe is readily removable from the base 22 as when being utilized as a geographical globe, and while seated upon the base 22, the globe and antenna are universally adjustable or shiftable so that the antenna structure can be given any desired positioning relative to an incoming signal or signals. The base 22 thus forms what might be termed a universal cradle or rest for the globe 15 and associated elements, whereby the globe may be turned or swiveled in the manner of a ball within a spherical socket.

The antenna structure of the present invention is designated generally by the numeral 24, and simplified means are provided for mounting the antenna structure 24 bodily within the globe 15. Such means comprises an elongated tubular rod 25, preferably screw-threaded externally throughout its entire length. A rectangular mounting plate 26 of electrical insulating material, such as fibre board or the like, has a central opening receiving the rod 25, and the mounting plate 26 is positioned at or near the longitudinal center of the rod and clamped in such position by a pair of clamping nuts 27, mounted upon the screw-threaded rod 25 on opposite sides of the mounting plate. The antenna structure 24 to be described is carried by the mounting plate 26 and screw-threaded rod 25, these elements being clearly shown alone in Figure 9.

One end of the screw-threaded rod 25 receives a first nut 28, which may be a hexagon nut, and outwardly of this nut a flat washer 29 is placed over the rod 25. The

end of the rod is received by a central opening 30 formed through the hemispherical globe section 17 at the location of the south pole. A preferably round nut 21, previously referred to as the south pole designating element of the assembled device, is applied to the end of the rod 25, exteriorly of the globe section 17. The globe section is securely clamped between the nut 21 and the washer 29, and by this means, the globe section is connected with the antenna structure. Diametrically opposite the opening 30, the companion globe section 16 has an opening 31 formed therethrough at the location of the north pole, and this opening receives the opposite end portion of the screw-threaded rod 25, which carries an end adjustable clamping nut 20 outwardly of the globe section 16, Figure 6. In assembly, the rod 25 and the elements carried thereby are first secured to the globe section 17 in the above described manner, and the meeting edges 18 of the globe sections may have glue applied thereto, and the globe section 16 is then applied over the rod 25 until the edges 18 abutt or contact. The nut 20 is then applied to the end of the rod 25 and tightened, and the two globe sections are securely clamped together while the glue is drying to complete the assembly. The nut 20 has been previously referred to as being the north pole designating element of the completed device, Figure 2.

The antenna structure 24 carried by the insulating mounting plate 26 comprises four angularly equidistantly spaced radiating arms 33 of wood, plastic or other suitable electrical insulating material. The arms 33 are spaced ninety degrees apart as best shown in Figure 7 and are rigidly secured to the bottom of the plate 26 by means of screws 34 or the like. The outer ends of the arms 33 extend somewhat beyond the edges of the mounting plate 26, and their inner ends are spaced radially somewhat from the rod 25, as shown. A radio wave receiving or antenna element 35 is carried by the outer end of each insulating arm 33, and the several elements 35 are identical. Each element 35 is formed of sheet metal and embodies a central flat disc portion 36, secured directly to the end of the associated arm 33 by means of a screw 37 or the like. Each antenna element 35 further comprises a plurality of circumferentially equidistantly spaced radial extensions or elements 38, integral with the central disc portion 36 and surrounding the same and symmetrically disposed with respect thereto. The elements 38 are arranged at inclined angles to the disc portion 36, and the elements 38 diverge outwardly from the supporting arm 33, as shown. The extensions or elements 38 also diverge from the axis of the rod 25 as shown in Figure 6. The included angle between any diametrically opposed pair of the elements 38 is an obtuse angle, considerably greater than ninety degrees. The extremities of the radial elements 38 may be inwardly curled as indicated at 39, and this curled construction may be omitted if desired. In the embodiment shown, each antenna element 35 has six of the extensions 38, and this arrangement has been found to be highly satisfactory when used with television receivers. However, the number of the extensions 38, their spacing, length and angle of divergence may be altered somewhat as found desirable. The arrangement is such that the antenna elements 35 are arranged within the globe 15, centrally thereof, in diametrically opposed pairs, and the elements 35 of each pair are in spaced back-to-back relation, with their extensions 38 fanning outwardly from the disc portions 36. The several antenna elements 35 constitute a quadrant antenna, capable of receiving or picking up a signal from any direction on the compass, and the elements 35 work in conjunction to strengthen the incoming signal, regardless of the direction or quadrant from which it originates. It might be mentioned here that while it is not entirely understood how the particular antenna structure functions in a technical sense, to produce the desired results, still it has been found in actual practice that the particular antenna, when used in conjunction with various television receivers, in quite a number of different localities, gave very superior picture and sound reception, as compared with conventional indoor and outdoor aerials.

The insulating mounting plate 26 carries a pair of main electrical terminals A and B, as shown, and these terminals are arranged near one pair of corners of the plate 26 and spaced beyond one side of the supporting rod 25. A pair of plug receiving socket elements 40 are mounted upon the globe section 17 and spaced from the corresponding side of the rod 25 in general alignment with the terminals A and B, Figures 4, 6 and 9. Jumper wires 41 serve to electrically connect the socket elements 40 with the terminals A and B inside of the globe, as shown. The socket elements 40 are rigidly secured to an insulating mounting strip 42, rigidly secured to the inner face of the globe section 17, and the socket elements 40 are preferably flush with the outer surface of the globe. The main antenna cable 43 leading to the television receiver, not shown, has a pair of prong or plug elements 44 insertable within the tubular socket elements 40 and readily detachable therefrom, Figure 10. The elements 40 and 44 in assembly and the terminals A and B are spaced from the same side of the rod 25, as shown, and the rod 25 forms the diametrical axis of the globe between its north and south poles. The antenna structure is preferably provided with a conventional impedance balance coil 45, having one end electrically connected with one socket element 40, Figure 6, and its opposite end electrically connected at 46 with the metal rod 25. The coil 45 may be omitted, if desired.

The wiring between the several antenna elements 35 and the main terminals A and B is disposed upon the lower side of the mounting plate 26 having the arms 33, as best shown in Figure 7. Each antenna element 35 has a pair of terminals 47, as indicated, and as viewed in Figure 7, one terminal 47 of the uppermost element 35 is connected with the terminal A by a wire 48. Moving clockwise, in Figure 7, the corresponding terminal of the next element 35 is connected with the main terminal B by means of a wire 49. The corresponding terminal 47 of the next antenna element 35, moving in the clockwise direction, is connected with the main terminal A by a wire 50 and the corresponding terminal 47 of the final element 35 is connected with the terminal B by a wire 51. The other terminals 47 of the respective elements 35, beginning with the uppermost element 35, are alternately connected with the terminals B and A by wires 52, 53, 54 and 55, Figure 7. The arrangement is such that the terminals 47 of diametrically opposed elements 35 are electrically connected with each other, through the main terminals A, Figure 7. The terminals 47 of the uppermost element 35, Figure 7, are connected with the terminals 47 of the lowermost element by the pairs of wires 48 and 50 and 52 and 54, which are respectively connected with the terminals A and B, beneath the plate 26. Correspondingly, the terminals 47 of the other pair of elements 35 are electrically connected through the terminals A and B by the pairs of wires 53 and 55 and 49 and 51. The wiring arrangement shown particularly in Figure 7 is substantially the same as the wiring arrangement between the several terminals 25 and 26 in Figure 6 of the drawings of my co-pending application Serial Number 561,254, filed Jan. 25, 1956 for Antenna.

It may now be seen that through the medium of the wiring shown in Figure 7, the terminals A and B and the jumper wires 41, that the several antenna elements 35 are all interconnected electrically with each other and with the terminals A and B and with the antenna cable 43 leading to the television receiver.

Operation

In use, generally speaking, the plugs 44 and cable 43 are disconnected from the sockets 40 when it is desired to use the geographical globe 15 as such. The globe

may then be picked up and turned in the hand as desired, or turned or swiveled to the desired position while resting upon the base **22**. The globe is universally adjustable with respect to the base because it is free from attachment thereto and merely rests in the spherical seat afforded by the base.

When used as an antenna, the plugs **44** are inserted in the socket elements **40**, and again, generally speaking, the globe **15** is adjusted or swiveled upon the base **22** until the desired orientation of the antenna structure **24** is obtained. In different localities, the degree or type of adjustment of the globe **15** required to produce the best television reception may vary somewhat, as should be obvious, and by virtue of the spherical globe **15** and its mounting base **22**, the possible adjustments or positions for the antenna structure are without limit. The user of the device will always be aware of the position or orientation of the antenna structure **24**, even though the same is concealed inside of the glove **15**. This is true because the instructions which will accompany the device will teach the relationship previously described between the visible socket elements **40**, the terminals A and B and the antenna arms **33**. Also, the user can readily memorize the relationship of the plugs **44** or socket elements with respect to the south pole **21** and with respect to the geographical indicia **19** on the globe. Hence, the user should never be at a loss to known or visualize just how the antenna structure **24** is positioned within the globe **15** for any given position of the latter.

Once the globe antenna is properly adjusted or tuned to a given channel, it should ordinarily not be necessary to reposition the assembly for any change in channels, although this may not always be true under some conditions and slight readjustment of the globe may be necessary.

The general procedure to be followed for setting or tuning the antenna is as follows. The globe **15** is placed upon the cradle **22** with the north pole **20** arranged uppermost and the "western hemisphere" portion of the indicia **19** arranged forwardmost, Figure 1. The globe is now turned in the cradle **22** slightly toward the front until the equator line **18** is in approximately the position shown in Figure 1. This places the south pole **21**, not shown in Figure 1, somewhat rearwardly of the base **22** and the socket elements **40** for the plugs **44** directly above the south pole.

The globe **15** is now turned clockwise upon the base **22** for approximately sixty-five degrees, moving the north pole **20** to the position shown in Figure 2. When this adjustment is made, the north and south poles **20** and **21** should be maintained in substantially the same vertical plane as shown in Figure 1.

The plugs **44** are now inserted into the socket elements **40** while the device is positioned as in Figure 2. One plug **44** is directly above the other plug, and both plugs are above the south pole **21**. The globe **15** is then moved in the cradle until the top plug **44** is to the rear of the lower plug and slightly above it, and care should be taken not to change the angle of the equator line **18** when making this setting. The user should now note the position of the north and south poles, equator, western hemisphere and cradle **22**.

The cradle or base **22** is now turned clockwise somewhat as viewed from the top, Figures 1 to 3, until it is positioned as in Figure 3. In some localities, it may be desirable to turn the cradle **22** horizontally in the opposite direction, at this time, to achieve the desired television reception. In most locations, however, the final setting of the antenna as shown in Figure 3 will be ideal, inasmuch as it places the antenna structure **24** in the best receiving position.

While the above operational procedure is based upon the results of testing with an actual full size antenna, still it is desired not to limit the invention to any particular sequence of operational or adjusting steps, and it has already been stated that the antenna is capable due to its mounting within the spherical globe of being universally adjusted to substantially any desired position, and the user will obviously adjust the device in the manner found most desirable in the particular locality or with the particular television receiver.

In Figure 11, there is shown a slight modification of the antenna structure **24** illustrated in Figure 7. In Figure 11, each arm **33** carries a superposed pair of the antenna elements **35**, as shown, there being a suitable insulating spacer element **33'** arranged between the elements **35** of each pair. Otherwise, the mechanical construction in Figure 11 is identical in all respects with the corresponding construction shown and described in connection with Figures 1 to 10 inclusive. With regard to the wiring in Figure 11, it is identical with the wiring in Figure 7, except that for each superposed pair of antenna elements **35**, one of the terminals **47'** is positioned on one element **35** and the other terminal **47'** is positioned upon the other element **35** of the pair. The respective wires connecting the main terminals A and B with the several antenna elements **35** are arranged in Figure 11 in substantially the identical manner shown in Figure 7 in connection with the corresponding wires, and a further description is believed to be unnecessary. If desired, further or additional pairs of antenna elements **35** may be added in superposed relation to the ends of the arms **33** in the manner shown in Figure 11, with the use of additional spacers **33'**, in the manner shown. If such additional pairs of elements **35** are employed in the antenna structure, the additional terminals **47'** and the respective wires connected therewith will alternate or be staggered in the manner shown in Figure 11 with respect to the added elements **35**. For example, if another pair of elements **35** were added at the right hand side of the structure in Figure 11, the wire **49** would jump or bypass the present outermost element **35** and be connected with the next added element **35**. The wire **53** would jump or bypass the next added element **35** and would be electrically connected at **47'** to a second added element **35**. This scheme would be followed with respect to the other three sets or groups of elements **35** if additional elements are used.

The operation or use of the antenna structure in Figure 11 is substantially identical to that described above in connection with the first form of the invention.

It is to be understood that the forms of the invention herewith shown and described, are to be taken as preferred examples of the same, and that various changes in the shape, size and arrangement of parts may be resorted to, without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. In combination, a hollow substantially spherical globe, a substantially spherically curved cradle for said globe and rendering it adjustable in all directions, a rod-like member secured to the globe and extending diametrically therethrough, an insulating supporting plate secured to the rod-like member near its longitudinal center, a plurality of antenna elements carried by said supporting plate inside of said globe, wiring interconnecting the antenna elements, and an antenna cable associated with the globe and electrically connected with the antenna elements and wiring.

2. A device of the character described comprising a hollow substantially spherical globe formed from a pair of companion substantially hemispherical globe sections having meeting circumferential edges adapted to be glued together, a screw-threaded rod extending diametrically of the companion globe sections substantially normal to a plane through their meeting edges, each globe section having a central opening receiving end portions of the rod, nut means carried by the end portions of the screw-threaded rod and engaging the globe sections for securing them to the rod and clamping their meeting edges in

abutting engagement, radio wave antenna sructure bodily mounted upon said rod within the globe, and a supporting base for the globe having a substantially spherical seat receiving the globe so that the globe is readily adjustable circumferentially in all directions for properly orienting said antenna structure to receive the incoming radio signal.

3. A television antenna comprising a supporting member, a plurality of arms secured to the supporting member and radiating therefrom, an antenna element secured to the outer end of each arm and having a central disc-like portion and a plurality of radial extensions projecting from the disc-like portion, a pair of main terminals carried by the supporting member, wiring interconnecting the antenna elements and main terminals, a substantially spherical globe connected with the supporting member and substantially completely closing and concealing from view all of said arms, antenna elements and wiring, and a supporting base for the globe having a spherically curved seat upon which the globe is freely slidable for adjustment circumferentially in all directions.

4. An antenna device comprising a hollow substantially spherical globe having socket means to receive the plug elements of an antenna cable, a substantially diametrical supporting member connected with the globe, antenna structure bodily mounted upon said supporting member within the globe and having a pair of main terminals, and wiring connecting the main terminals and socket means of the globe so that the antenna cable when plugged into the globe will be electrically connected with the antenna structure, said globe being universally adjustable with the antenna structure.

5. A television antenna comprising a geographical globe having geographical indicia visible upon its outer surface, a supporting rod extending diametrically of said globe and having its ends secured to the globe and defining the north and south poles of the geographical globe, socket means carried by the globe and oriented with respect to said supporting rod and geographical indicia and adapted to receive the plug-in means of an antenna cable, antenna structure carried by the supporting rod within the globe and concealed by the globe, the antenna structure including a pair of main terminals having a known orientation with respect to said socket means and to certain parts of the antenna structure, and a supporting base for the globe upon which the globe is turnable in all directions for orienting the antenna structure properly with respect to the incoming radio signal, the arrangement being such that the user of the television antenna is aided in adjusting the same by said orientations.

6. Antenna structure comprising a supporting member, an insulating plate secured to the supporting member near its longitudinal center and arranged substantially at right angles thereto and adjustable lengthwise thereof and having an opening receiving the supporting member, opposed pairs of arms secured to one side of said plate and extending generally radially thereof and of the supporting member, disc-like metallic antenna elements secured to the outer ends of said arms and including inclined diverging circumferentially spaced radial projections of considerable lengths, each disc-like element having a pair of terminals, a pair of main terminals carried by said insulating plate, wiring interconnecting the terminals of the disc-like elements and the main terminals and disposed upon one side of said insulating plate, jumper wires connected with the main terminals upon the other side of said plate, a hollow globe connected with the supporting member and substantially enclosing it and the elements carried thereby, socket means secured to the hollow globe and adapted for connection with the plug-in means of an antenna cable and electrically connected with said jumper wires upon the interior of said globe, and a supporting base for the globe slidably engaging the latter and upon which the globe is universally turnable for the purpose of properly orienting the antenna elements with respect to the incoming radio signal.

7. Antenna structure according to claim 6 wherein said socket means of the globe is substantially flush with the external surface of the globe.

8. An antenna for television receivers and the like comprising a hollow geographical globe, a rod extending diametrically through said globe and secured near its ends to the wall of the globe, mounting means secured to said rod near its longitudinal center and within the globe, antenna structure carried by said mounting means within the globe and adapted for connection with a television receiver, and a supporting base for the globe having a seat formed to the contour of the globe and slidably engaging the globe so that the latter is universally adjustable circumferentially upon said seat, the globe being readily liftable from the supporting base for study as a geographical globe, the globe being adjusted in the desired directions while resting upon said base for orienting the antenna structure with respect to the incoming radio signal.

9. An antenna device comprising a substantially spherical globe having an internal chamber, a spherically recessed supporting base for the globe and slidably engaging the globe so that the latter is universally adjustable circumferentially upon the supporting base, connector means secured to the wall of said globe outside of the supporting base and free of connection therewith and adapted for electrical connection with the terminals of an antenna cable, an antenna structure fixedly mounted within the interior chamber of the globe and being electrically connected with said connector means upon the wall of the globe.

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