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S. GALPER
TELEVISION ANTENNA
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2,551,664

FIG. 1.

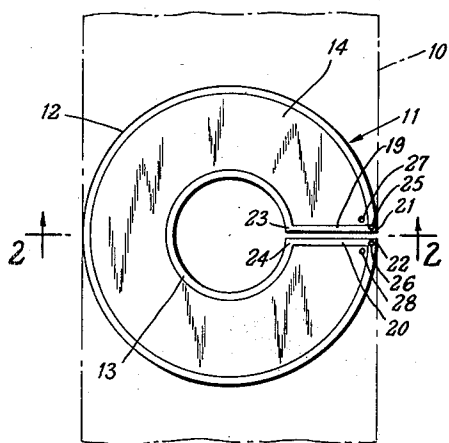


FIG. 2.

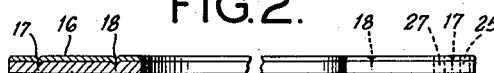


FIG. 4.

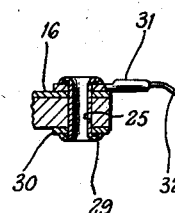


FIG. 3.

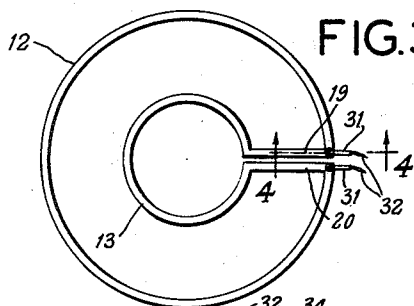


FIG. 6.

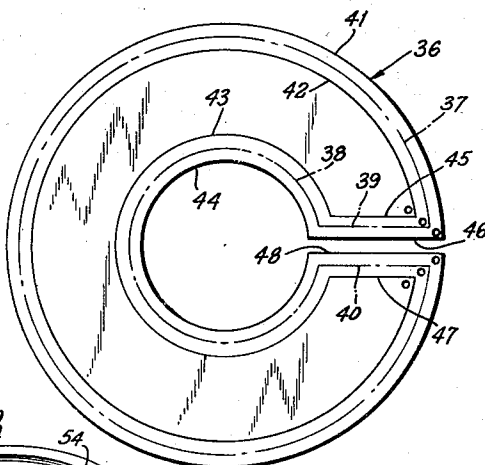


FIG. 5.

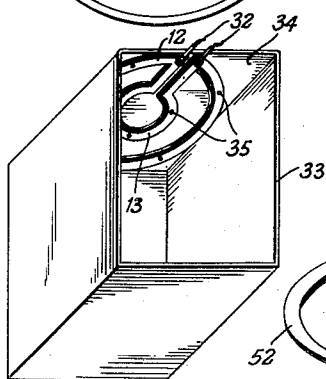
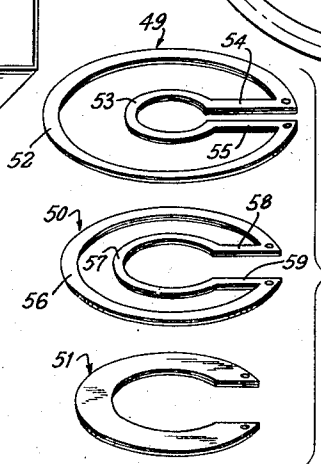


FIG. 7.



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TELEVISION ANTENNA

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3 Claims. (Cl. 250—33)

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This invention relates to television antennas, particularly to non-directional antennas of the folded type for indoor or inbuilt use.

It is primarily within my contemplation to provide an antenna construction wherein the half-wave folded dipole elements are of circular configuration, there being two concentric elements for high and low bands of the television spectrum, the assembly being so constructed as to be simple to fabricate, easy to handle, convenient to ship and store, and sufficiently rigid to maintain the component elements in predetermined relative disposition.

Attempts have been made to employ wire elements as the antenna components of a dipole construction, by mounting said wires on a cardboard backing which had previously been slit to provide flaps under which the wire components were manually slipped for frictional attachment to the backing. It has been found that this type of construction was costly, and in order to maintain a proper spaced relation between the high and low frequency elements, considerable caution and skill were required, therefore adding considerably to the labor costs. It is one of the important objects of my invention to provide a dipole construction having none of the aforesaid high labor cost factors, and which will nevertheless have the advantages of an efficient and convenient antenna construction.

It is a further object of my invention to provide an antenna device of the aforesaid class capable of mass production manufacture by means of conventional die cutting and laminating methods.

Still another object of my invention is to provide a construction which will comprise several complete antennas from a single die-cut unit, whereby said several antennas may readily be separated from the unit prior to installation. And in this aspect of my invention it is an important object to provide a die-cut multiple antenna construction including electrically joined high and low frequency folded dipole components, and another folded dipole element adapted for FM modulation frequencies between the said high and low television bands.

Other objects, features and advantages will appear from the drawings and the description hereinafter given.

Referring to the drawings,

Figure 1 is a plan view of a multiple antenna unit die-cut from a sheet shown by dot-dash lines, in accordance with a preferred form of my invention.

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Figure 2 is an enlarged fragmentary section of Figure 1 taken along line 2—2.

Figure 3 is a folded dipole antenna, for high and low frequency bands, formed from the unit of Figure 1, and showing transmission line connections to the low frequency element.

Figure 4 is an enlarged section of Figure 3 taken substantially along line 4—4.

Figure 5 is a perspective rear view of an open television cabinet with the antenna of Figure 3 operatively in place.

Figure 6 is a plan view of another form of antenna unit comprising three separable antennas, and

Figure 7 is a perspective disassembled view of the three antennas formed from the structure of Figure 6.

In the various forms of my invention illustrated, I employ a backing of relatively stiff material, such as cardboard, upon which is adhesively applied a sheet of metal foil, such as aluminum. Thereafter, according to the method of my invention, antenna units are stamped out of the sheet, preferably by die-cutting methods, leaving scoring lines to enable the separation of two or more antennas from each unit.

By referring to Figure 1 it will be seen that the main sheet 10 is of a laminated construction, comprising an insulating backing and a metallic foil on one surface thereof. By die-cutting or other suitable means, the antenna unit 11 is blanked out to form two separable antennas, to wit, the antenna comprising the two folded circular dipoles 12 and 13, and the flat multiband antenna 14. Unit 11 comprises the backing 15 of cardboard or other relatively stiff material, and the metal foil 16 (Figure 2).

According to the structures of Figures 1 and 2, the flat antenna 14 is separated from the circular concentric elements 12 and 13 by the circular cuts or scoring circles 17 and 18, the said scorings extending only partially through the backing 15 so that members 12, 13 and 14 are held together as a unit, but which are nevertheless capable of ready separation along said scoring circles.

The circular elements 12 and 13 are proportioned to serve as half-wave folded dipoles, element 12 being for low frequency bands and element 13 for high frequency bands. Said elements 12 and 13 are maintained in proper spaced relation, when in the form shown in Figure 1, by the member 14 and the two connecting members 19 and 20. As will be observed from the drawings, the elements 12 and 13 are almost complete cir-

cles, the outer ends 21 and 22 of element 12, and the outer ends 23 and 24 of element 13 being spaced from each other, respectively, the said ends 21 and 23 being electrically joined by connecting element 19, and the said ends 22 and 24 being electrically joined by connecting element 20. The said ends 21 and 22 of the outer element 12 contain the apertures 25 and 26 respectively; and the outer terminal portions of the intermediate antenna member 14 contains the apertures 27 and 28. These apertures are adapted to receive transmission line lugs substantially of the kind shown in Figure 4.

The unit 11 of Figure 1 is, as aforesaid, adapted to be handled with its component parts in assembled relation; and in this manner can be shipped either to the point of use, or to the factory where antennas are attached to the cabinets. Or, if it is desired, the intermediate flat television antenna 14 may be pressed out from the unit in known manner.

Figures 3 and 4 show an antenna formed from the unit 11, the intermediate antenna 14 having been removed. It will be observed that in each of said holes 25 and 26 (25 in Figure 4) is an eyelet 29 the opposite heads of which are in engagement with a washer 30 and the lug 31, respectively, the latter being electrically connected to the transmission line 32. Since said lug is in engagement with the metal foil 16, it is obvious that the transmission line 32 is electrically connected to both elements 12 and 13.

The antenna of Figure 3 can be employed indoors, either on the floor, under a carpet—or it may be used as an inbuilt antenna like that shown in Figure 5. The television cabinet 33 contains, attached to the underside of roof 34, the antenna of Figure 3, the flat circular elements 12 and 13 being attached by fasteners 35 to said roof 34. The transmission lines 32 are electrically connected, in a manner well-known in the art, to the tuner or to an added pickup.

It is thus apparent that by a simple stamping or die-cutting operation, applied to a laminated sheet including a backing and a metal foil, a convenient, easily handled and efficient high-and-low frequency band antenna, of the folded dipole type, is provided. Not only could the device be easily shipped, but it is readily applied in the manner indicated. Furthermore, it is readily fabricated without the use of difficult labor operations, such as would be necessary if circular wires were to be attached manually to a supporting backing.

It should further be noted that the antenna member 14, pressed out from unit 11, may serve the purpose of an FM antenna. In many localities the FM frequencies lie approximately between the high and low frequency television bands; and in such locales member 14 will adequately serve as an FM antenna. Although such an antenna would not have specific definition between bands, it nevertheless could serve, in certain inexpensive receivers, as a satisfactory multi-band antenna.

The unit 36 shown in Figure 6 is substantially like unit 11 of Figure 1, except that it is slightly differently proportioned and scored so as to enable three antennas to be formed therefrom. The dot-dash circles 37 and 38, joined by the connecting lines 39 and 40 represent the critical proportions of a circular dipole construction for the high and low bands of the television spectrum. Circle 37 is intermediate circles 41 and 42; and circle 38 is intermediate circles 43 and

44. Similarly, line 39 is intermediate connecting lines 45 and 46; and line 40 is intermediate connecting lines 47 and 48. When unit 36 is die-cut along the said circles and lines, and the components pressed out as shown in Figure 7, three separate antennas are produced, these being antennas 49, 50, and 51. Antenna 49 contains dipole elements 52 and 53, these being defined by the edges 41, 37, 38 and 44 (Figure 6), elements 52 and 53 being joined by the connecting elements 54 and 55. Antenna 50 contains the circular elements 56 and 57, these being defined by the edges 37, 42, 43 and 38, the elements 56 and 57 being joined by the connecting elements 58 and 59. Antenna 51 is the flat multiband type, substantially like antenna 14, above-mentioned, and is defined by the edges 42 and 43. Although in this construction the mean diameters of the antenna elements of antennas 49 and 50 are not equal to the critical diameters 37 and 38, they are nevertheless adapted to receive satisfactory signals for the high and low bands, for all practical purposes. And the antenna 51 is similarly suitable for FM bands between the high and low television bands.

It will be observed that in the unit of Figure 6, the outer portion thereof defined by circles 41, 37 and 42 embodies in contiguous relation the elements 52 and 56, and the elements 53 and 57, respectively, shown in Figure 7. The antenna 49 is larger than and embraces the antenna 50; and the antenna 51 is disposed, on the sheet of Figure 6, intermediate the positions of the two arcuate elements 56 and 57 shown on Figure 7.

In both forms of the invention illustrated, the intermediate antennas 14 and 51 are wider than the circular elements 12 and 13, and the elements of antennas 49 and 50, respectively. The width of the backings of the various antennas shown are the same as of the foil sheets to which they are attached, rendering the antennas readily adaptable to be formed from flat laminated sheets by conventional die-cutting methods.

In the above description, the invention has been disclosed merely by way of example and in preferred manner; but obviously many variations and modifications may be made therein which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or manner of practicing same, except in so far as such limitations are specified in the appended claims.

I claim:

1. A laminated sheet unit for forming a plurality of television antennas, said sheet unit comprising a flat sheet of metal foil and an insulating backing therefor, the foil and backing combination being scored to produce a plurality of separable parts, one of said parts being of the configuration of an antenna comprising two looped elements in spaced relation with two spaced connector members joining said elements, another of said parts comprising the portion intermediate the said two looped elements and being defined by said elements and the said connecting members, said latter part being of the configuration of a looped antenna and being wider than the looped elements of said first-mentioned antenna, whereby it is adapted for frequencies between those of the two said first-mentioned elements.

2. A laminated sheet unit for forming a plurality of television antennas, said sheet unit comprising a flat sheet of metal foil and an insulating backing therefor, the foil and backing com-

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5 bination being scored to produce a plurality of separable parts, one of said parts being of the configuration of an antenna comprising two looped elements in spaced concentric relation, the ends of each of said looped elements being in adjacent spaced relation, whereby said elements are almost complete loops, said looped foil elements being electrically connected by two spaced connecting members of metal foil extending from the ends of one of said elements to the corresponding ends of the other element, whereby said elements and members form a continuous electrically connected conductor comprising an inner high frequency antenna element and electrically connected thereto an outer low frequency antenna element; another of said parts being of the configuration of a looped antenna and being wider than the looped elements of said first-mentioned antenna, whereby it is adapted for frequencies between those of the two said first-mentioned elements.

3. A laminated sheet unit for forming a plurality of television antennas, said sheet unit comprising a flat sheet of metal foil and an insulating backing therefor, the foil and backing combination being scored to produce three separable parts, two of said parts being each of the configuration of an antenna comprising two looped

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elements in spaced relation with two spaced connector members joining said elements, said elements and members being in contiguous relation, whereby one of the antennas embraces and is larger than the other; the third of said parts comprising the portion of said sheet disposed between the two looped elements of the smaller of said two first-mentioned antennas and being defined thereby and by the connecting members; said third part being of the configuration of a looped antenna and being wider than the looped elements of said first-mentioned antennas, whereby it is adapted for frequencies between those of the two first-mentioned antennas.

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