

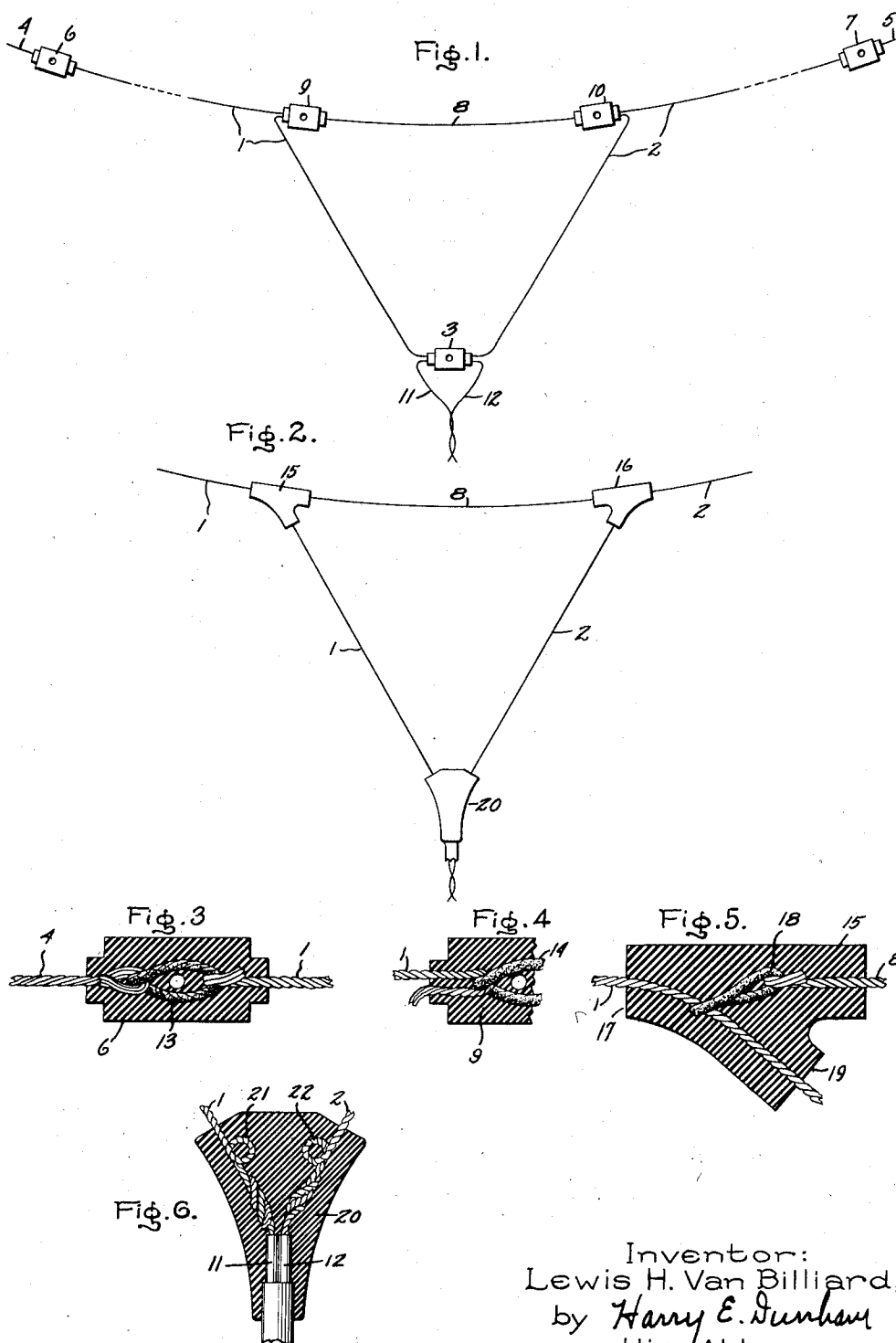
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My invention relates to radio antennae and more particularly to antennae of the doublet type.

With the advent of all-wave radio receiving systems it has become increasingly important that only specially designed antennae be used in conjunction therewith. Short waves are used primarily because of their ability to travel great distances with relatively low transmitting power. Hence these waves are generally far weaker and fade more severely than those from stations in the standard broadcast band (540 to 1500 kilocycles). It is obvious, therefore, that the antenna must perform very efficiently in the short wave bands or reliable results will be practically impossible. For any given wave length a conventional antenna favors certain frequencies and tends to discriminate against others. One type of antenna which has been found to give highly satisfactory results is an antenna of the V-doublet type. Such an antenna is described in a copending application of Robert B. Dome, Serial No. 758,917 which is assigned to the same assignee as the present application.

To obtain best results the antenna must be properly installed. Since all wave receivers are now a common household appliance, the facility with which the antenna employed therewith may be installed is of great importance. It is an object of my invention to provide an antenna structure which may be completely assembled into an integral unit at the factory, packed into a compact unit for convenience and economy in shipment, and which may be then, with the greatest convenience, unpacked and installed for operation by an unskilled person with assurance of obtaining satisfactory results.

A further object of my invention is to provide such an antenna which is free from breakable insulators, such as those of glass, and which at the same time avoids the necessarily cumbersome connections to such insulators.

It is a still further object of my invention to provide an antenna including conductors and insulators formed into an integral unit, and which when properly suspended from suitable supporting members forms an antenna of the V-doublet type.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawing.

Fig. 1 diagrammatically illustrates an antenna embodying one form of my invention.

Fig. 2 is a diagrammatical view of a portion of an antenna embodying a modified form of my invention.

Figs. 3 and 4 are cross sectional views of two of the insulators used in conjunction with the antenna shown in Fig. 1.

Figs. 5 and 6 are cross sectional views of two of the insulators used in conjunction with the antenna shown in Fig. 2.

Referring to Fig. 1 of the drawing, I have illustrated therein an antenna constructed in accordance with my invention, and which comprises oppositely extending conductors 1 and 2. These conductors have their inner ends secured together but insulated from each other by insulator 3 and their outer ends supported from suspension members 4 and 5 through the strain insulators 6 and 7, respectively. Intermediate points on the two conductors are mechanically and nonconductively connected together by a suitable supporting member 8 which is of such a length as to retain conductors 1 and 2 in the desired form, which may be that of the V-doublet shown in the drawing. The ends of the supporting member 8 are connected to the conductors 1 and 2 through insulators 9 and 10, respectively. Transmission line 11 and 12 may be soldered or otherwise connected to conductors 1 and 2 either within the insulator 3 or at a point exterior thereof.

The preferred form of my invention having the insulators molded directly to the conductors may be more readily understood by reference to Figs. 3 and 4 of the drawing. Fig. 3 illustrates the manner in which the outer end of conductor 1 is connected to the suspension member 4 through the insulator 6. The outer end of conductor 1 is bent over a small ring 13 of nonconducting material. The suspension member 4 is similarly bent over the opposite side of ring 13. Rubber is then molded about the joint to form insulator 6. In order that the rubber will withstand ageing in the sun and weather, the mix may have some suitable substance added for this purpose. It will be apparent that the purpose of ring 13 is to provide a means for relieving the rubber of large tensional stresses. Insulator 7 is formed in a similar manner about the outer end of conductor 2 and the end of the suspension member 5.

Insulators 9 and 10 are constructed in a manner similar to that of insulators 6 and 7 with the exception that the conductor does not terminate within the insulator. Referring to Fig. 4, it will be seen that conductor 1 passes through the ring

14 and is bent back on itself for a distance sufficient to bring the conductor outside of the insulator. The supporting member 8 is connected to the ring 14 in a manner similar to that of suspension member 4 on ring 13. Rubber is then molded about the joint to form insulator 9. It will be noted that by bending conductor 1 in the manner described the same type of mold may be used for insulator 9 as is used for insulator 6. Insulator 10 is formed in a manner similar to insulator 9.

Insulator 3 may be formed from the same type of mold as that used for either insulator 6 or insulator 9 by passing conductors 1 and 2 through the ring of insulating material in the manner similar to the passage of conductor 1 through insulator 9 as described above.

From the above description it will be apparent that the antenna described comprises a single integral unit which may be readily assembled at the factory. The antenna unit may be folded into a small compact kit which may be easily shipped and readily stored. By merely connecting the suspension members 4 and 5 to a pair of antenna masts or any other suitable supporting members, the unskilled purchaser may install the antenna for operation with assurance of obtaining satisfactory results therefrom when used in conjunction with an all-wave radio receiver.

It will be observed that all fragile insulators, such as those of glass, together with the necessarily cumbersome connections thereto are obviated in the construction shown, thereby reducing the volume of the unit when packed for shipment, reducing breakage in shipment, and increasing the facility with which the unit may be handled and installed. Mere suspension of the unit by attaching suspension members 4 and 5 to supports of suitable height and distance apart is substantially all that is required.

Fig. 2 of the drawing illustrates a modified form of my invention wherein molds of different shapes are used to provide insulators of a more pleasing appearance. In this modification I have substituted insulators 15 and 16 for the insulators 9 and 10 of Fig. 1. Insulators 15 and 16 have a form which permit conductors 1 and 2 to pass directly therethrough. This will be readily understood by reference to Fig. 5 where I have shown a cross section of insulator 15. Conductor 1 enters the insulator 15 through end surface 17, passes through the ring 18 of nonconducting material and then passes out of the insulator through end surface 19. Supporting member 8 is connected to ring 18 in the manner similar to that described in connection with Fig. 1. Insulator 16 is formed in the manner similar to that of insulator 15.

In the place of the insulator 3 of Fig. 1, an insulator 20 may be employed, this insulator having a generally delta shape. Since the stresses are relatively small in the insulator which is used to

connect the inner ends of conductors 1 and 2, I have omitted the ring of nonconducting material which serves to relieve the large tensional stresses in the other insulators. Instead, I simply loop each conductor once as is indicated at 21 and 22. As is indicated in the cross sectional view of insulator 20 as shown in Fig. 6, the transmission line 11 and 12 is spliced to the conductors 1 and 2, respectively, within the body portion of the insulator 20.

While I have shown particular embodiments of my invention, it will of course be understood that I do not wish to be limited thereto, since many modifications may be made, and that I therefore contemplate by the appended claims to cover all such modifications as fall within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination, an antenna doublet comprising a pair of oppositely extending conductors, means including a supporting member for mechanically connecting said conductors together at points intermediate the ends thereof, insulating means molded to said conductors at said intermediate points and to the ends of said supporting member for connecting the ends of said supporting member to said conductor, and a second insulating means molded to the inner end of said pair of conductors, the length of said supporting member between said first insulating means relative to the length of said conductors between said first and second insulating means being such that when said antenna doublet is suspended from the outer ends of said conductors it falls into substantially an inverted delta formation, said conductors extending continuously through said insulators to form the opposite sides of the doublet.

2. The combination, in an antenna doublet construction, a pair of conductors and a support, means whereby said pair of conductors and support form an integral unit of delta form when suspended from an end of each of said conductors beyond and not greatly above said delta, said means comprising insulation units molded to said conductors one at each corner of said delta, said insulators being of such form that said conductors extend through said insulators and project therefrom along the natural lines of said delta without abrupt bends at said insulators and are supported in said delta form by said support extending between a pair of said insulator units.

3. An antenna comprising a pair of oppositely extending conductors, a transmission line connected to the adjacent ends of said conductors and a single substantially delta-shaped insulator molded about said connections, each of said conductors having a loop therein within said insulator.

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