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Fig. 1.

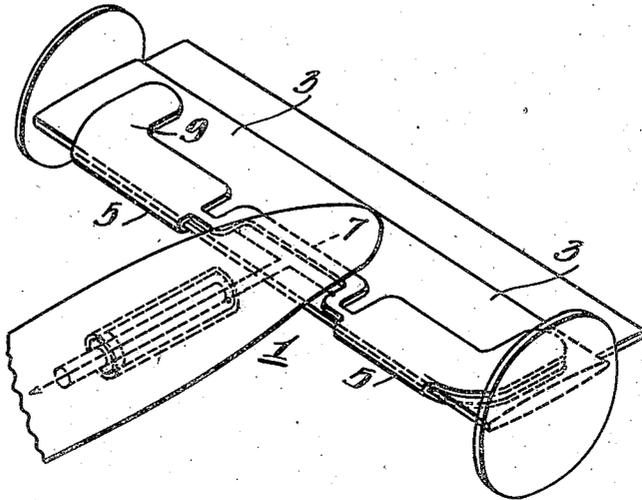


Fig. 2.

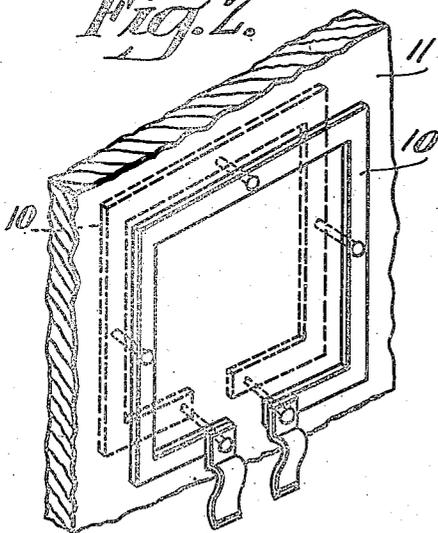


Fig. 3.



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4 Claims. (Cl. 250-33)

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This invention relates to radio antennas and more particularly to antennas suitable for use on aircraft, or in other locations where weight and space requirements are important. The usual antenna installation involves, in addition to the antenna itself, one or more leads, supporting members, and frequently a matching transformer or similar device. These components contribute to the weight, and in the case of mobile craft may interfere with streamlining. Light airplanes and gliders frequently are constructed so that it is difficult to attach an antenna securely at the desired location on the body of the craft. Slipstream forces on the antenna impose substantial stresses on the antenna support, as well as increasing the parasitic drag.

It is an object of this invention to provide an improved antenna system which requires substantially no space, and is of very light weight. A further object is the provision of an improved antenna requiring no special supporting structure.

The invention will be described with reference to the accompanying drawing, of which Fig. 1 illustrates the antenna of this invention installed at the tail of a glider or light aeroplane, Fig. 2 shows a loop antenna constructed according to the invention, and Fig. 3 is a straight rod antenna.

Referring to Fig. 1, the tail assembly 1 of a glider or light airplane is shown. The horizontal surfaces 3 may comprise skeletal members covered with a light fabric or may be of wood or plastic. The antenna is a dipole having oppositely extending portions 5 at the leading edges of the surfaces 3, and swept-back portions 9 at its ends, comprised of a thin film of conductive material, preferably copper. The film may be deposited by spraying, for example, or plating metal on the surfaces in areas of the required shape and preferably in intimate contact with the surface of the support.

The purpose of the swept-back portions 9 in the antenna of Fig. 1 is to provide some radiation to the sides of the craft. If the parts 9 are each one quarter wavelength long, the antenna will radiate equally in all directions.

When an antenna is constructed by depositing a metallic film on the surface of a body of wood or similar material, it has several characteristics unlike those of antennas comprising wires or rods supported in space. The resonant length of a dipole, for instance, is less in the case of an antenna supported throughout length by a dielectric material than in an antenna in space.

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The resonant impedance is lower; and if the dielectric is largely in the field of the antenna, its losses are high. These dielectric effects may be minimized by enclosing the dielectric, as nearly as possible, with the metallic film. Thus in Fig. 1 the films 5 are shown extending over the leading edge and under the surface 3 so as to substantially surround the forward portion of the member 3. It will be found that a dipole constructed in this manner still exhibits a lower impedance than that of a dipole in free space; if it is desired to increase the impedance, to match a transmission line, for example, the antenna may be made shorter, to resonate at a higher frequency than that at which it is to be used. It will then have a capacitive reactance at the desired frequency and may be shunted by a loading inductance to resonate at that frequency. By selecting the proper antenna length and loading, the resonant impedance may be adjusted to the desired value. The loading inductance 7 in Figure 1 comprises a strip of conductive film extending between the inner ends of the antenna elements 5. If a broad resonance is desired, the strips 5 may be made relatively wide in proportion to their lengths as shown in Fig. 1.

Referring to Fig. 2, a loop comprising strips 10 of metallic film is supported on the surfaces of a body 11 of non-conductive material, such as wood. The strips on opposite sides of the supporting body are connected together. Since the voltage along the two strips is the same at corresponding points, there is substantially no electric field in the dielectric material between the strips, and thus the dielectric losses are minimized.

Fig. 3 shows a rod antenna comprising a metallic coating 13 on the surface of a tubular member 15 of insulating material, such as Bakelite bonded fabric. The member 15 may also function as a strut or similar device, and since it is enclosed by the conductive coating, there is no electric field induced in it by energy applied to the antenna.

Although the invention has been shown in specific forms for the purpose of illustrating and describing its operation, it is not intended to be limited except to the extent of the appended claims.

We claim as our invention:

1. A radio antenna comprising a relatively non conductive supporting body, discrete particles of conductive material disposed in intimate engagement with the surface of said supporting body,

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said particles constituting substantially electrically homogeneous films in the form of pairs of strips connected together so as to substantially embrace portions of said supporting body, said pairs of strips being so located and connected with respect to each other as to present the electrical characteristic of an inductively loaded dipole.

2. In combination with an aircraft provided with airfoil means having surfaces of substantially non conductive material, a radio antenna comprised of discrete particles of conductive material in intimate engagement with portions of said surfaces, said particles constituting substantially electrically homogeneous films in the form of pairs of strips connected together so as to substantially embrace portions of said airfoil means, said pairs of strips being so located with respect to each other as to present the electrical characteristics of an inductively loaded dipole.

3. A loop antenna comprising a non conduc-

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tive supporting body with substantially parallel opposed surfaces, discrete particles of conductive material in intimate engagement with juxtaposed portions of said opposed surfaces, said particles constituting substantially electrically homogeneous films lying in strips defining the boundaries of substantially plane figures and connected in parallel, whereby dielectric losses in said supporting body are minimized.

4. A radio antenna comprising a non-conductive supporting body, and discrete particles of conductive material disposed in intimate engagement with portions of the surface of said body, said particles constituting substantially electrically homogeneous films in the form of pairs of strips connected together so as to substantially embrace portions of said supporting body whereby dielectric losses in said supporting body are minimized.

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