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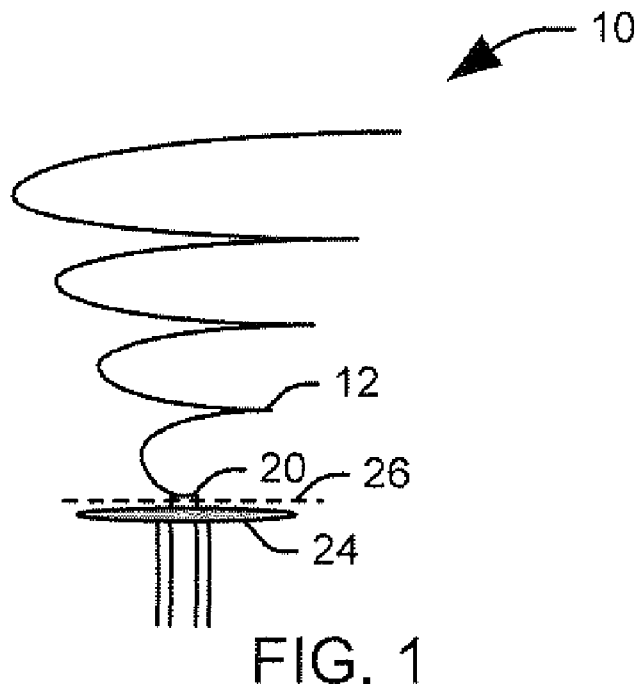
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(54) Title: ANTENNA ASSEMBLY HAVING REDUCED PACKAGING SIZE



(57) Abstract: An antenna assembly is provided, including a first radiative element. The first radiative element is oriented such that a first end of the radiative element is operatively connected to an antenna feed and at least a portion of the radiative element includes a first conical, helical coil. The first conical, helical coil reaches a maximum diameter at a point farthest from the antenna feed. A counterpoise structure includes one of an electrically conductive ground structure operatively connected to a ground associated with the antenna feed and a second radiative element operatively connected to the antenna feed and the first radiative element at the antenna feed.



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AMENDED CLAIMS

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Having described the invention, I claim:

1. An antenna assembly comprising:
a first radiative element comprising a conical, helical coil, a first end of the radiative element being operatively connected to an antenna feed, the first radiative element having a height above the connection to the antenna feed between four-hundredths of the characteristic wavelength and one-tenth of the characteristic wavelength and being configured to reach a maximum diameter at a point farthest from the antenna feed; and
a counterpoise structure comprising one of an electrically conductive ground structure operatively connected to a ground associated with the antenna feed and a second radiative element operatively connected to the antenna feed.
2. The antenna assembly of claim 1, the first radiative element having a straightened length of approximately three-tenths of a characteristic wavelength of the antenna.
3. The antenna assembly of claim 1, the counterpoise structure comprising one of a hemispherical or conical ground structure formed from one of a solid conductive material, a plurality of curvilinear elements, or a conductive mesh.
4. The antenna assembly of claim 1, the counterpoise structure comprising a planar ground structure.
5. The antenna assembly of claim 1, the counterpoise structure comprising the second radiative element, the second radiative element comprising a second conical, helical coil, wherein the second conical, helical coil reaches a maximum diameter at a point farthest from the antenna feed, an axis of a cone defined by the second radiative element being substantially collinear with an axis of a cone defined by the first radiative element.

6. The antenna assembly of claim 1, the counterpoise structure comprising the second radiative element, the second radiative element comprising a planar spiral coil, an axis of a cone defined by the first radiative element being substantially perpendicular to a plane of the spiral coil.

7. The antenna assembly of claim 1, the conical, helical coil being connected to the antenna feed at a first end, the first radiative element further comprising a first linear element, operatively connected at a first end to a second end of the conical, helical coil, and extending from a circumference of a largest coil of the conical, helical coil to a center of the largest coil, and a second linear element, extending from a second end of the first linear element in a direction perpendicular to the first linear element.

8. The antenna assembly of claim 7, the antenna assembly being configured to operate at a characteristic frequency of twenty-seven megahertz, the first radiative element having a total height of approximately four feet.

9. The antenna assembly of claim 7, the first radiative element further comprising a capacitance hat operatively connected to a second end of the second linear element, the capacitance hat comprising third and fourth linear elements connected at their midpoints to the second end of the second linear element as to be perpendicular to one another and the second linear element.

10. The antenna assembly of claim 7, the first radiative element further comprising a capacitance hat operatively connected to a second end of the second linear element, the capacitance hat comprising third, fourth, and fifth linear elements connected at a common apex at the second end of the second linear element and extending at oblique angles to one another and the second linear element.

11. The antenna assembly of claim 1, the first radiative element further comprising a first linear element operatively connected at a first end to the antenna feed and extending away from the antenna feed, the conical, helical coil being operatively connected to a second end of the first linear element.

12. The antenna assembly of claim 1, the conical, helical coil being operatively connected to the antenna feed at a first end, and a height of the conical, helical coil from the antenna feed to a second end of the conical, helical coil being approximately four-hundredths of a characteristic wavelength of the antenna.

13. The antenna assembly of claim 1, the first radiative element extending as a length of conductive material having a substantially flat cross section, such that a width of the conductive material along a first cross-sectional direction is significantly less than a width of the conductive material along a second cross-section direction orthogonal to the first cross-sectional direction.

14. The antenna assembly of claim 13, wherein the width of the length of conductive material along the second cross-sectional direction is greater at a second end of the first radiative element than the width of the length of conductive material along the second cross-sectional direction at the first end of the first radiative element.

15. The antenna assembly of claim 14, wherein the width of the length of conductive material along the second cross-sectional direction increases continuously from the first end of the radiative element to the second end of the radiative element.

16. The antenna assembly of claim 14, wherein the width of the length of conductive material along the second cross-sectional direction is between five to ten times greater at the second end of the radiative element than at the first end of the radiative element.

17. An antenna assembly, having a characteristic wavelength associated with an operating frequency of the antenna, comprising:

a conical, helical radiative element, oriented such that a first end of the radiative element is operatively connected to an antenna feed, at least a portion of the radiative element comprising a conical, helical coil, wherein the conical, helical coil reaches a maximum diameter at a point farthest from the antenna feed; and

a planar ground structure with a diameter less than one-tenth of the characteristic wavelength.

18. The antenna assembly of claim 17, the conical, helical radiative element being configured to have a height, from the antenna feed to the point farthest from the antenna feed, between four-hundredths of the characteristic wavelength and one-tenth of the characteristic wavelength.

19. The antenna assembly of claim 17, the conical, helical radiative element having a height above the connection to the antenna feed between four-hundredths of the characteristic wavelength and one-tenth of the characteristic wavelength.

20. The antenna assembly of claim 17, wherein the characteristic frequency is 2.4 GHz, and the straightened length of the conical, helical element is substantially equal to one and one-half inches.

21. An antenna assembly, having a characteristic wavelength associated with an operating frequency of the antenna, comprising:

a conical, helical radiative element, a first end of the radiative element being operatively connected to an antenna feed, the conical, helical radiative element having a height above the connection to the antenna feed between four-hundredths of the characteristic wavelength and one-tenth of the characteristic wavelength and being configured to reach a maximum diameter at a point farthest from the antenna feed; and

a counterpoise structure comprising one of an electrically conductive ground structure operatively connected to a ground associated with the antenna feed and a second radiative element operatively connected to the antenna feed.

22. The antenna assembly of claim 21, the counterpoise structure comprising one of a hemispherical ground structure and a conical ground structure, the ground structure having a sidelength substantially equal to one-quarter of the characteristic wavelength.

23. The antenna assembly of claim 21, further comprising a first linear radiative element, operatively connected at a first end to a second end of the conical, helical radiative element, and extending from a circumference of a largest coil of the conical, helical coil to a center of the largest coil, and a second linear radiative element, extending from a second end of the first linear element in a direction perpendicular to the first linear element.

24. The antenna assembly of claim 23, wherein the characteristic frequency is 27 MHz, and the total height of the conical, helical element, the first linear radiative element, and the second linear radiative element above the connection to the antenna feed is substantially equal to four feet.