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(54) Title: PLANAR ANTENNA ARRAY AND ARTICLE OF MANUFACTURE USING SAME

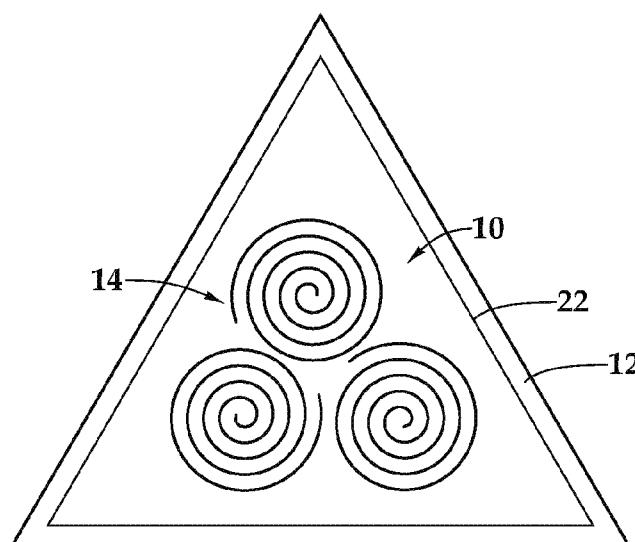


Fig.3B

(57) Abstract: A planar antenna array (10) and articles of manufacture using the same are disclosed. In one embodiment, close-packed antenna elements (14), disposed on a substrate (12), number $N = 3x$ and x is a positive integer. Each of the close-packed antenna elements (14) includes a substantially continuous photonic transducer (16) arranged as an outwardly expanding generally logarithmic spiral (18) having six turns (20A, 20B, 20C, 20D, 20E, 20F). Each of the outwardly expanding generally logarithmic spirals (18) may be a golden spiral. As an article of manufacture, the planar antenna array (10) may be incorporated into a chip (30), such as a cell phone (40), or an article of clothing (50), for example.