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CC-E: Claim Chart Comparing claims 2-3 and 6 of the '432 Patent to Misra in view of Cohen-PCT under 35 U.S.C. § 103

Prior art cited in this chart:

- Misra, Ita et al, "Experimental Investigations on the Impedance and Radiation Properties of a Three-Element Concentric Microstrip Antenna," Microwave and Optical Technology Letters, Vol. 11, No. 2, February 5, 1996, ("Misra").
- PCT Application No. WO 99/27608 to Cohen, published June 3, 1999, ("Cohen-PCT").

Reason to Combine:

Misra and Cohen-PCT, are both concerned with the analysis and development of small fractal antennas. A person skilled in the art seeking to develop antennas of the nature claimed by patentee would combine the teachings of the references as they have a strong correlative nature. Where Cohen-PTC both hypothesizes and analyzes quantitative findings for multiple fractal antennas, Misra describes and analyzes quantitative findings with regard to a specific example of such. Moreover, the findings of Misra bear out the predictions of Cohen-PCT.

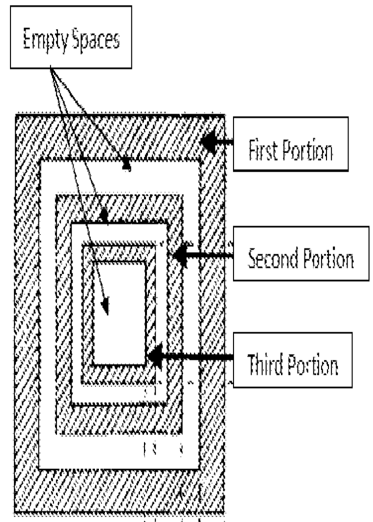
Claims of the '432 Patent	Disclosure of the Prior Art
Claim 1	
1. A multi-band antenna comprising:	"The present article deals with a concentric microstrip square-ring antenna (CMSRA) containing three elements." Misra, p. 67. "…the concentric microstrip square-ring antenna has a multiple band effect-with increase in total percent bandwidth with respect to the single square ring having the largest physical dimension of the CMSRA." Misra, p. 68.

TABLE 1 Comparison of Percent BW Between Single Square-Ring and Concentric Square-Ring Antennas

	Single Square Ring		Concentric Square Ring	
Feed location	Frequency range in GHz	% Bandwidth	Frequency range in GHz	% Bandwidth
Center feed	2.7 – 2.74 = 0.04	1.47	2.655 – 2.685 = 0.03	1.12
			5.31 – 5.435 = 0.125	2.32
			6.53 – 6.83 = 0.30	4.47
0.45 cm away from center	2.698 – 2.76 = 0.068	2.49	2.654 – 2.694 = 0.04	1.49
			6.64 – 7.5 = 0.86	12.16
Corner feed	2.638 – 2.692 = 0.054	2.02	2.612 – 2.65 = 0.038	1.44
			2.74 – 2.773 = 0.033	1.19
	2.805 – 2.852 = 0.047	1.66	6.74 – 7.2 = 0.46	6.6
			7.33 – 7.53 = 0.20	2.69

Table 1 – Misra

a conductive radiating element including at least one multilevel structure,



Annotated Figure 2(a) – Misra, p.67.

The caption of Fig. 2(a) reads: "Three-element concentric microstrip square-ring antenna." Misra , p. 67.

said at least one multilevel structure

"A three-element CMSRA has been designed and its measured impedance and radiation

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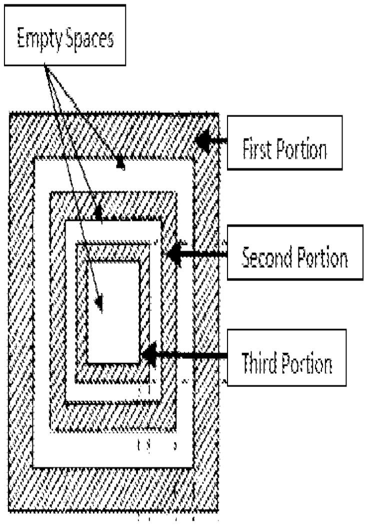
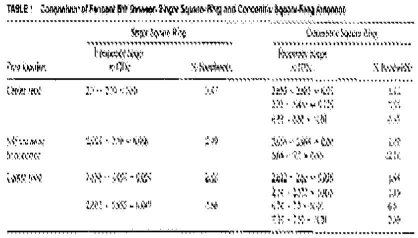
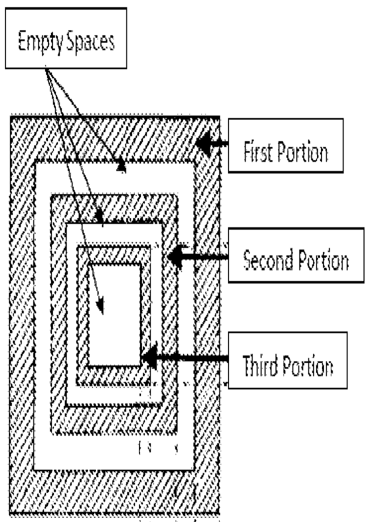
comprising a plurality of electromagnetically coupled geometric elements,	patterns have been compared with those of a single square-ring antenna having a dimension equal to the largest element of the CMSRA." Abstract, Misra , p. 66. "Electromagnetic coupling is an attractive aspect [of a microstrip antenna], due to its multilayered structure, which allows the antenna to be integrated with its feed circuitry." Misra , p. 67. Fig. 2a of Misra illustrates a three-element-concentric-microstrip square-ring-antenna (CMSRA) having a multilevel structure with a plurality of electromagnetically coupled geometric elements. See, Fig. 2a, Misra , p. 67.  **Annotated Figure 2(a) – Misra, p.67.**
said plurality of geometric elements including at least three portions, a first portion being associated with a first selected frequency band, a second portion being	"The compared 1: 2 [voltage standing wave band width] VSWR BW for the single square ring and concentric ring at different feed locations is given in Table 1. From this table, it is seen that the total 1: 2 VSWR BW is increased for the three element [concentric microstrip square-ring antenna] CMSRA as compared to that of the single ring. This effect is

associated with a second selected frequency band and a third portion being associated with a third selected frequency band,	prominent at the feed location 0.45 cm away from the center." Misra , p. 68.  **Table 1 – Misra** "The ring widths and spacings increase from the innermost element [of the antenna] to the outermost element." Misra, p. 68.
said second and third portions being located substantially within the first portion,	 **Annotated Figure 1 – Misra**
said first, second and third portions defining empty spaces in an overall structure of the conductive radiating element to provide a circuitous current path within the first portion, within the second portion and within the third portion,	"We have first chosen the innermost square-ring antenna with side *a* = 1.0 cm and width *w* = 0.2 cm. The spacing between the adjacent elements and their widths are then chosen…" Misra , p. 68. "The ring widths and spacings increase from the innermost element to the outermost element." Misra , p. 68.

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