

CC-B

Fractus S.A.

# CC-B: Claim Chart Comparing claims 1, 12-14, and 30 of the '431 Patent to Grangeat under 35 U.S.C. § 102

**Prior art cited in this chart:**

- Grangeat et al., “Multifrequency Microstrip Antenna and A Device Including Said Antenna”, U.S. Patent 6,133,879, Filed: December 11, 1998. (“Grangeat”)

Claims of the '431 Patent	Disclosure of the Prior Art
<b>Claim 1</b>	
1. A multi-band antenna comprising:	<p>“The present invention is more particularly concerned with the situation in which an antenna of the above kind must have the following properties: it must be a multifrequency antenna, i.e. it must be able to transmit and/or to receive efficiently on more than one operating frequency”</p> <p><b>Grangeat, Col. 3, lines 33-38.</b></p>
a conductive radiating element including at least one multilevel structure,	<p style="text-align: center;"><b>FIG_1</b></p> <p style="text-align: center;"><b>Figure 1 – Grangeat</b></p>

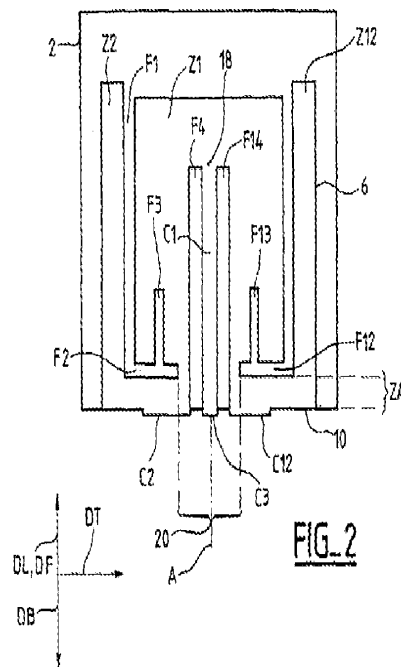


Figure 2 – Grangeat

“With the above aims in view, the present invention consists in a multifrequency microstrip antenna comprising:  
 a plane dielectric substrate;  
 a conductor constituting a ground plane on the bottom surface of said substrate;  
 a plurality of conductive zones on the top surface of the substrate and each having an elongate shape imparting a candlestick shape to the antenna;  
 an antenna coupling device common to all the conductive zones;  
 and wherein said conductive zones are separated from each other by slots the widths of which are very much less than the operating wavelengths of the antenna;  
 wherein said conductive zones are sufficiently decoupled from each other to enable various resonances to occur, respectively, in various areas formed by said zones, said resonances being at least approximately of the quarter-wave type;  
 and wherein each of said zones has an electric field node fixed by at least one short-circuit to the ground plane and said short-circuit is in the vicinity of the base of the candlestick.”

Grangeat, Col. 4, lines 41-64.

“The antenna further includes a coupling device in the form of a coupling line. The device includes a main conductor consisting of two sections C1 and C3 connected to the patch 6 at an internal connection point 18. It further includes a composite ground conductor that co-operates with the main conductor and is described below. It constitutes all or part of a connection system that connects the resonant structure of the antenna to a signal processing unit 8, for example to excite one or more antenna resonances from that unit in the case of a transmit antenna.”

**Grangeat, Col. 6, lines 7-16.**

“The antenna of the example is a dual-frequency antenna, i.e. it must give rise to at least two resonances so that it can operate in two modes corresponding to two operating frequencies. To this end a slot formed in the patch 6 opens towards the front and outside the patch. It constitutes a longitudinal separator slot F1. The longitudinal extent of this slot defines in the patch a front region Z2, Z1, Z12 in which the slot divides a primary zone Z1 from a secondary zone Z2. A rear region ZA extends between the front region and the rear edge 10. The rear region is preferably shorter and even more preferably much shorter in the longitudinal direction DL than the front region.”

**Grangeat, Col., 6, lines, 40-51.**

said at least one multilevel structure comprising a plurality of electromagnetically coupled geometric elements,

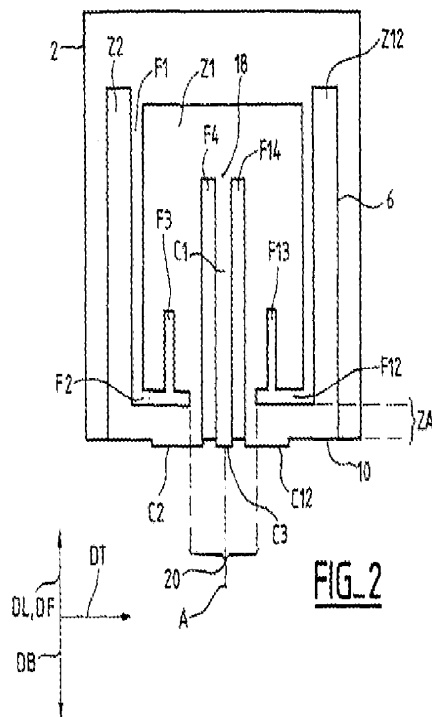


Figure 2 – Grangeat

“With the above aims in view, the present invention consists in a multifrequency microstrip antenna comprising:  
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 an antenna coupling device common to all the conductive zones;  
 and wherein said conductive zones are separated from each other by slots the widths of which are very much less than the operating wavelengths of the antenna;  
 wherein said conductive zones are sufficiently decoupled from each other to enable various resonances to occur, respectively, in various areas formed by said zones, said resonances being at least approximately of the quarter-wave type;  
 and wherein each of said zones has an electric field node fixed by at least one short-circuit to the ground plane and said short-circuit is in the vicinity of the base of the candlestick.”

Grangeat, Col. 4, lines 41-64.

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