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**Ayle**

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(54) **ACOUSTIC SEPTUM CAP HONEYCOMB**

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See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

3,895,152	A *	7/1975	Carlson et al.	428/116
4,257,998	A	3/1981	Diepenbrock et al.	
4,265,955	A *	5/1981	Harp et al.	428/116
4,421,201	A	12/1983	Nelsen et al.	
4,594,120	A	6/1986	Bourland, Jr. et al.	
5,041,323	A *	8/1991	Rose et al.	428/116
5,776,579	A *	7/1998	Jessup et al.	428/73
5,785,919	A *	7/1998	Wilson	264/401
5,866,216	A *	2/1999	Flasher	428/36.1

5,997,985	A *	12/1999	Clarke et al.	428/116
6,114,652	A *	9/2000	Clarke et al.	219/121.71
6,274,216	B1 *	8/2001	Gonidec et al.	428/116
6,371,242	B1 *	4/2002	Wilson et al.	181/292
6,536,556	B2	3/2003	Porte et al.	
6,609,592	B2 *	8/2003	Wilson	181/292
6,619,913	B2 *	9/2003	Czachor et al.	415/119
2001/0017232	A1 *	8/2001	Hogeboom et al.	181/286
2004/0163888	A1	8/2004	Johnson	
2005/0194210	A1 *	9/2005	Panossian	181/293

**FOREIGN PATENT DOCUMENTS**

GB	1463918	2/1977
GB	2098926	12/1982
GB	2252076	7/1992
JP	2000088062	A * 3/2000

\* cited by examiner

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(57) **ABSTRACT**

An acoustic structure that includes a honeycomb having cells in which septum caps are located. The septum caps are formed from sheets of acoustic material and include a resonator portion and a flange portion. The flange portion has an anchoring surface that provides frictional engagement of the septum caps to the honeycomb cells when the caps are inserted into the honeycomb during fabrication of the acoustic structure. An adhesive is applied to the anchoring surface of the septum caps after the caps have been inserted into the honeycomb cells to provide a permanent bond.

**22 Claims, 3 Drawing Sheets**

