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(54) **METHOD OF USING SACRIFICIAL MATERIALS FOR FABRICATING INTERNAL CAVITIES IN LAMINATED DIELECTRIC STRUCTURES**

(75) Inventor: **Kenneth A. Peterson**, Albuquerque, NM (US)

(73) Assignee: **Sandia Corporation**, Albuquerque, NM (US)

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(52) **U.S. Cl.** **156/89.11**; 156/89.12; 156/89.23; 264/610; 264/43; 264/44

(58) **Field of Classification Search** 156/89.11, 156/89.12, 89.23; 264/610, 43, 44
See application file for complete search history.

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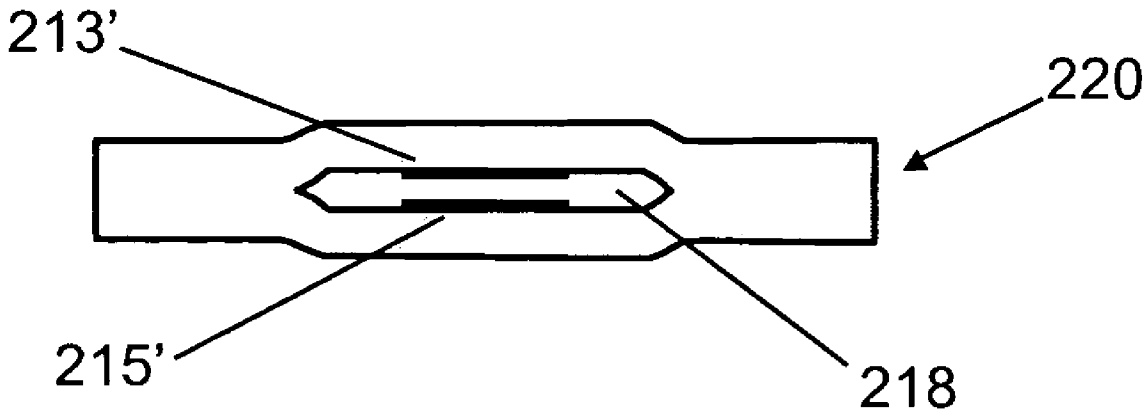
Primary Examiner—John L Goff
(74) *Attorney, Agent, or Firm*—Robert D. Watson

(57) **ABSTRACT**

A method of using sacrificial materials for fabricating internal cavities and channels in laminated dielectric structures, which can be used as dielectric substrates and package mounts for microelectronic and microfluidic devices. A sacrificial mandrel is placed in-between two or more sheets of a deformable dielectric material (e.g., unfired LTCC glass/ceramic dielectric), wherein the sacrificial mandrel is not inserted into a cutout made in any of the sheets. The stack of sheets is laminated together, which deforms the sheet or sheets around the sacrificial mandrel. After lamination, the mandrel is removed, (e.g., during LTCC burnout), thereby creating a hollow internal cavity in the monolithic ceramic structure.

32 Claims, 26 Drawing Sheets