

United States Patent [19]

[73] Assignee: IC Sensors, Inc., Milpitas, Calif.

Feb. 1, 1994

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73/756, 866.5, 204.22, 856; 174/260

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[22] Filed:

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5.394.326

[56]

Koen

[11] Patent]	Number:
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5,503,016

Date of Patent:

Apr. 2, 1996

[54]	VERTICALI	LY MOUNTED	2720484A1	11/1977	Germany
ACCELEROMETER CHIP		60-12750	1/1985	Japan .	
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[75]	Inventor: E	dward F. Koen, Danville, Calif.	WO91/11722	8/1991	WIPO.

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"Airbags Boom When IC Accelerometer Sees 50 G", by Frank Goodenough, Electronic Design, Aug. 8, 1991.

Primary Examiner-Hezron E. Williams Assistant Examiner-Christine K. Oda Attorney, Agent, or Firm-Skjerven, Morrill, MacPherson, Franklin and Friel; Norman R. Klivans

[57] ABSTRACT

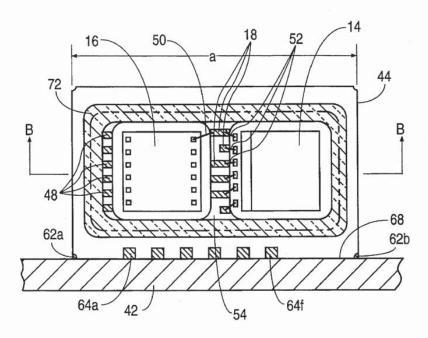
directly thereto.

Micro-machined accelerometer chips have a sensitive axis perpendicular to the principle surface of the device. In an application where the desired sensing direction is in the plane of a supporting printed circuit board, the accelerometer cannot be mounted directly on the printed circuit board and instead is mounted on a wall perpendicular to the printed circuit board. This requirement to wall-mount the sensor is eliminated by using an accelerometer chip packaged with a signal conditioning circuit in a multi layer ceramic chip carrier. Electrical connections are contained within the layers of the ceramic and terminate at a side surface of the chip carrier. Thus the accelerometer chip sits perpendicular to the printed circuit board and the ceramic chip carrier is attached

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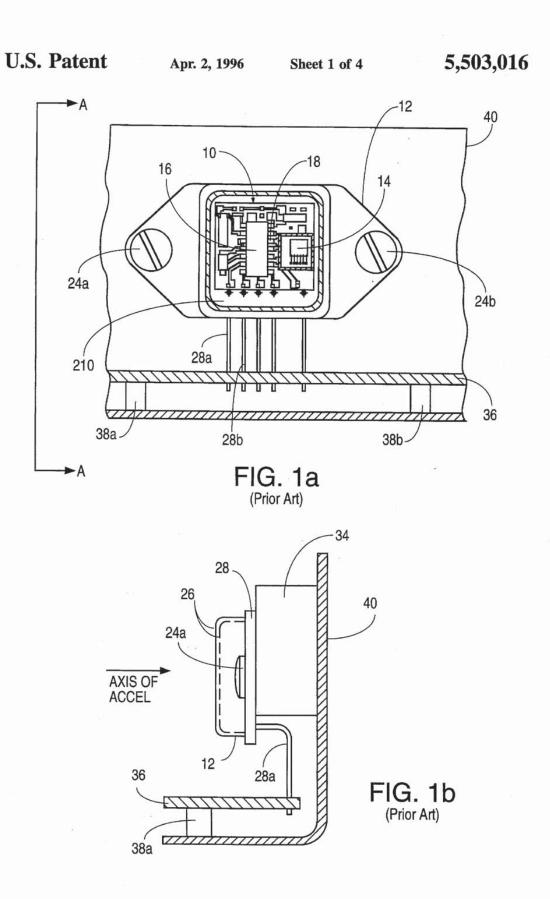
0557917A1 9/1993 European Pat. Off. .

18 Claims, 4 Drawing Sheets



Apple Inc. APL1039





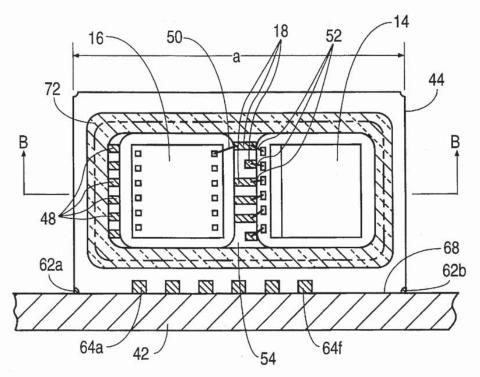


FIG. 2a

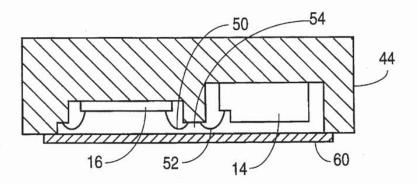
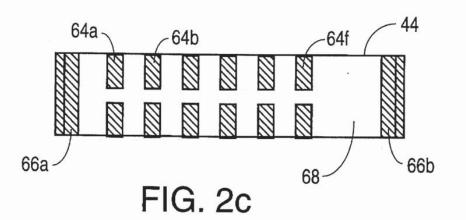
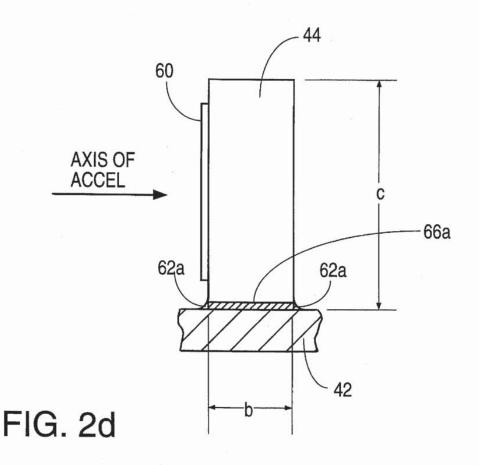


FIG. 2b







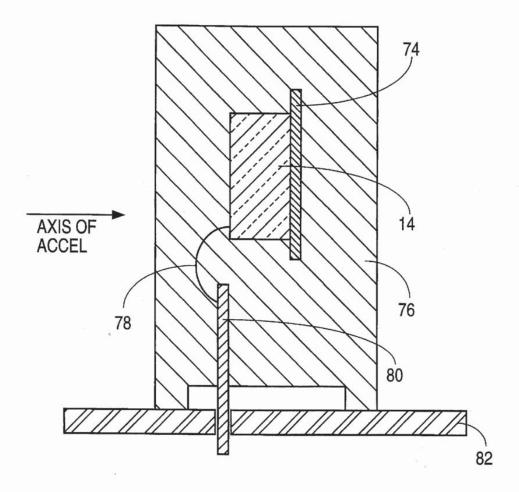


FIG. 3

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