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United States Patent [19]

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Shaw et al.

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[54] **MICROELECTROMECHANICAL LATERAL ACCELEROMETER**

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[21] Appl. No.: **67,264**

[22] Filed: **May 26, 1993**

[51] Int. Cl.⁶ **G01P 15/08**

[52] U.S. Cl. **73/514.18; 73/514.24**

[58] Field of Search 73/517 R, 514, 73/515, 516 R, 517 B, 514.18, 514.21, 514.24, 514.32, 514.35, 514.38, 514.36, 514.17

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Assistant Examiner—Christine K. Oda

Attorney, Agent, or Firm—Jones, Tullar & Cooper, P.C.

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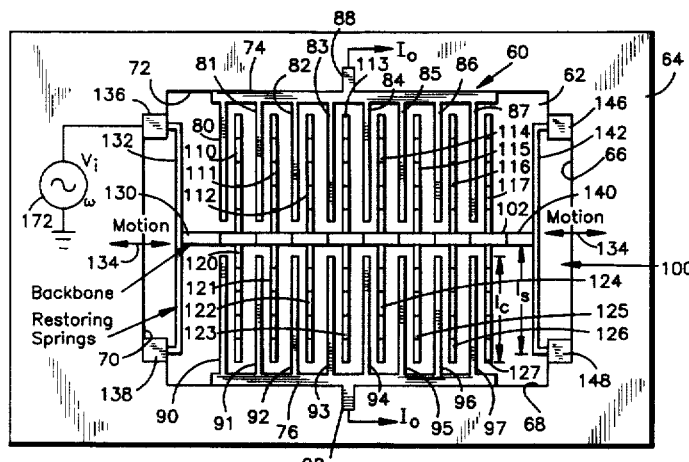
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[57] ABSTRACT

A microelectromechanical accelerometer having submicron features is fabricated from a single crystal silicon substrate. The accelerometer includes a movable portion incorporating an axial beam carrying laterally-extending high aspect ratio released fingers cantilevered above the floor of a cavity formed in the substrate during the fabrication process. The movable portion is supported by restoring springs having controllable flexibility to vary the resonant frequency of the structure. A multiple-beam structure provides stiffness in the movable portion for accuracy.

52 Claims, 5 Drawing Sheets



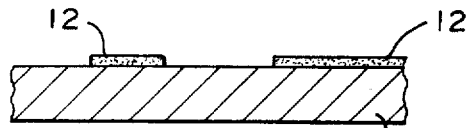


FIG. 1

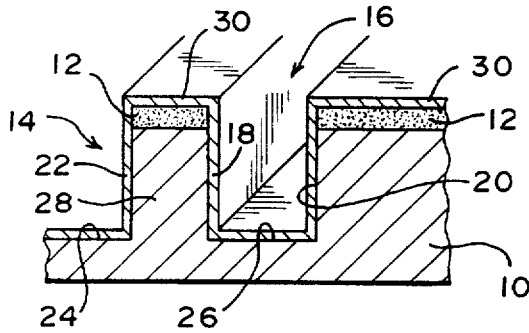


FIG. 2

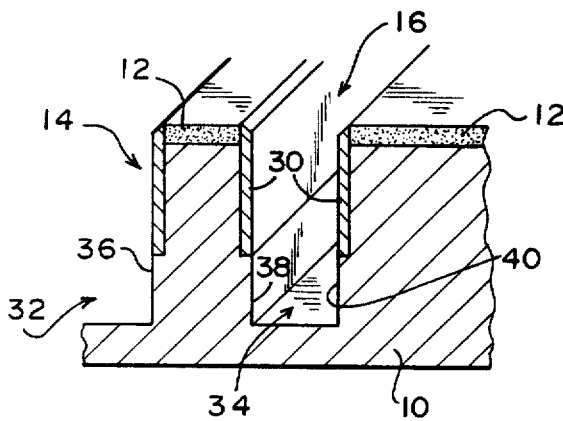


FIG. 3

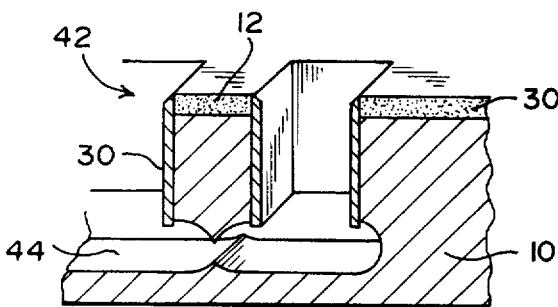


FIG. 4

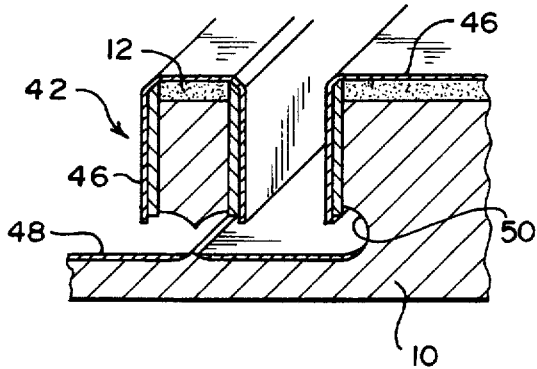


FIG. 5

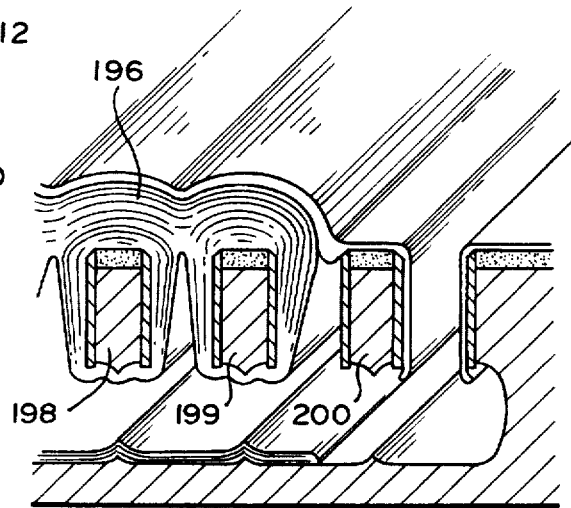


FIG. 9

FIG. 6

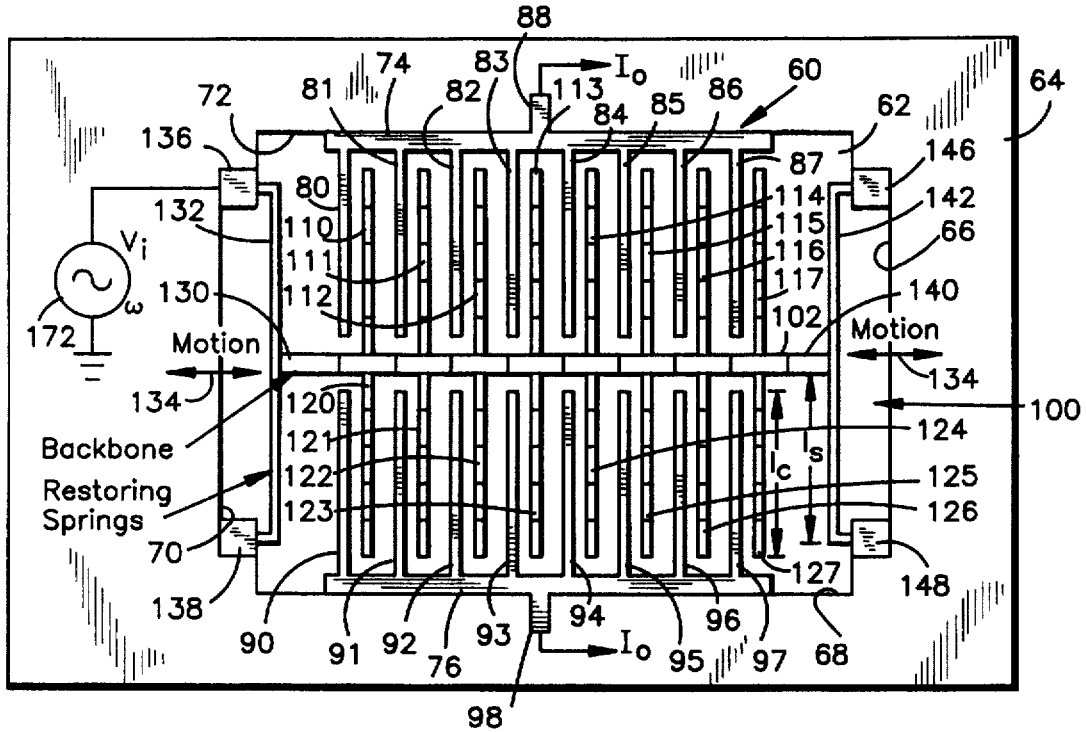


FIG. 7

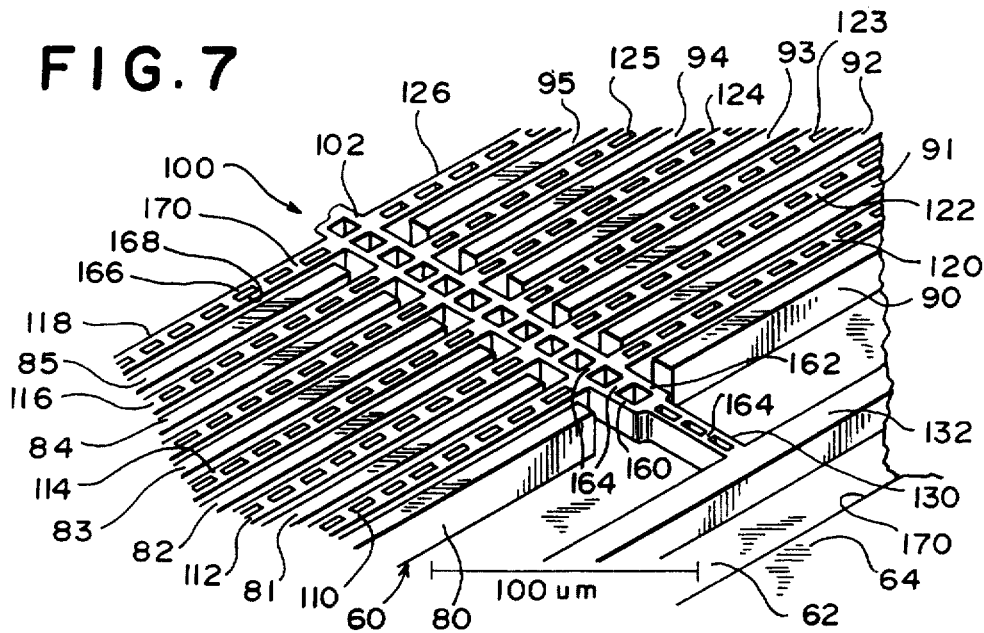


FIG. 8

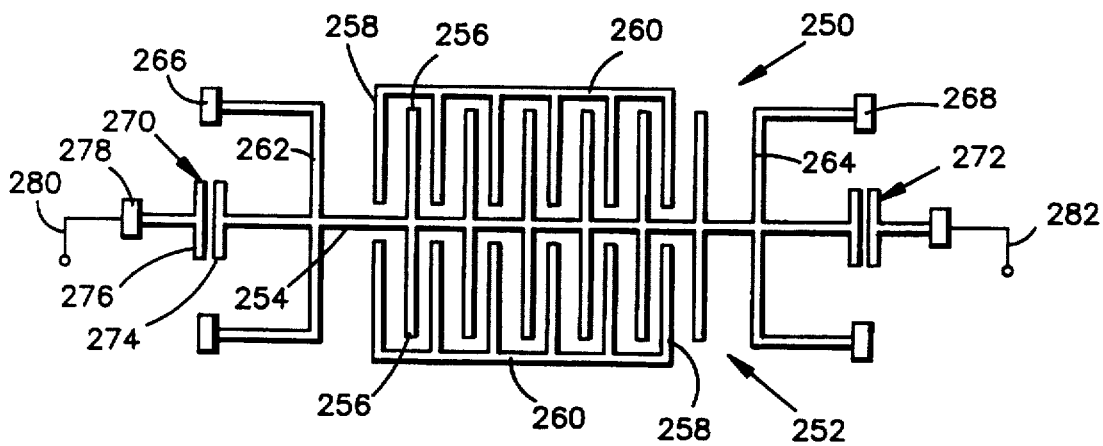
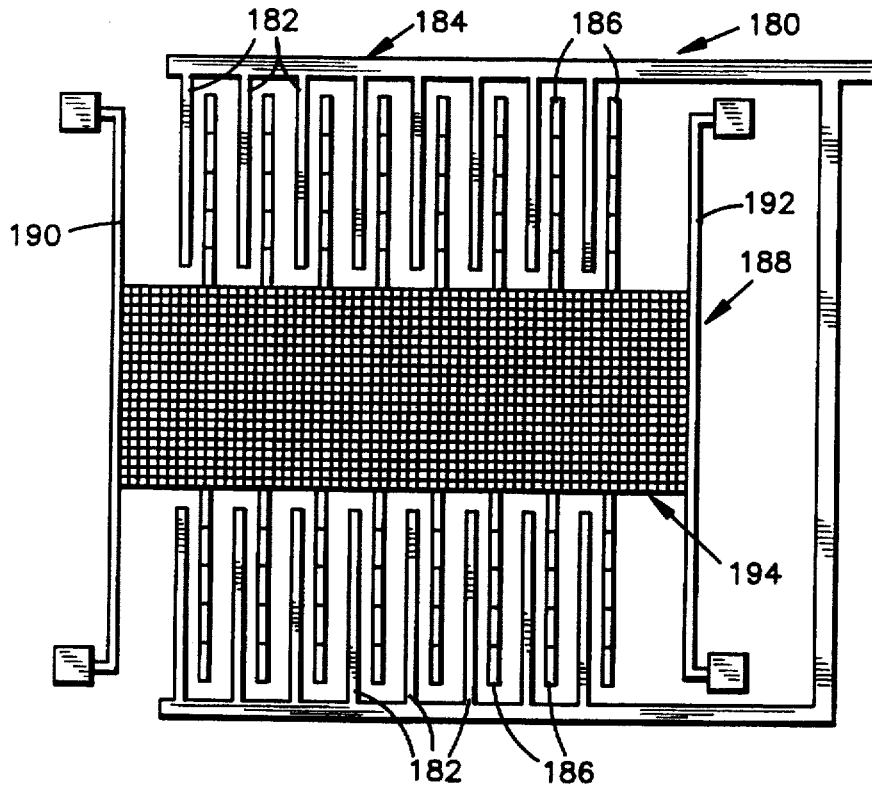


FIG. II

FIG. 10

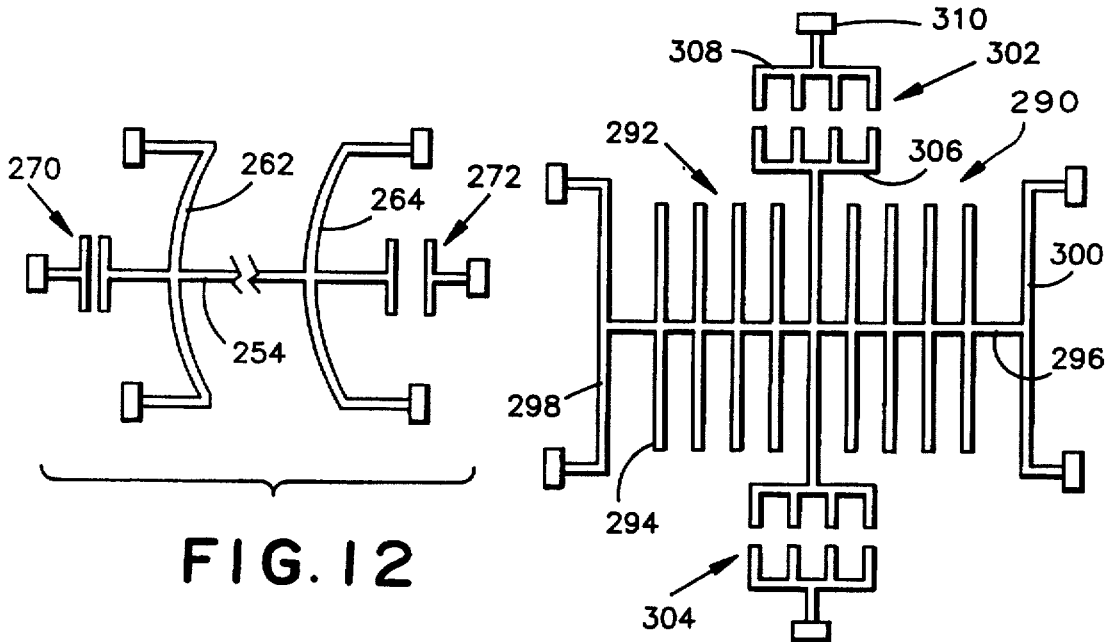
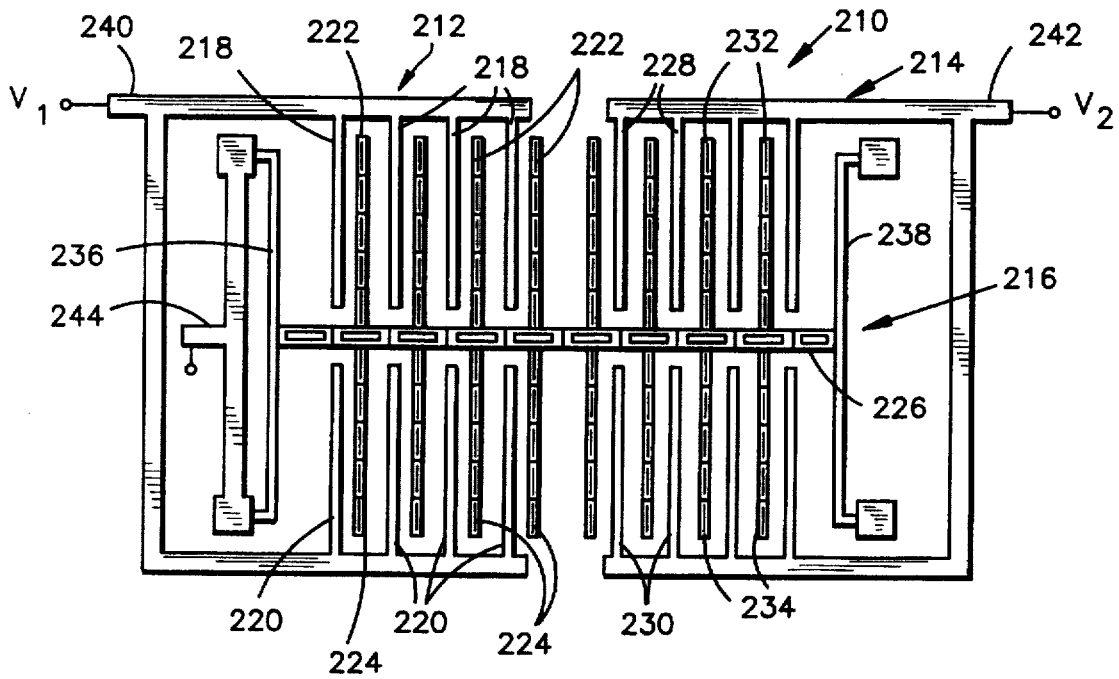


FIG. 12

FIG. 13

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