

[54] **ULTRA-THIN MICROELECTRONIC PRESSURE SENSORS**

[75] Inventors: **James F. Black**, Newington; **Thomas W. Grudkowski**, Glastonbury; **Anthony J. DeMaria**, West Hartford, all of Conn.

[73] Assignee: **United Technologies Corporation**, Hartford, Conn.

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[51] Int. Cl.<sup>3</sup> ..... **H01L 21/20; H01L 21/22**

[52] U.S. Cl. .... **29/583; 29/580; 29/578; 357/26; 338/4**

[58] Field of Search ..... **338/2, 4; 357/26; 29/610 SG, 589, 578, 583, 376 J, 580**

[56] **References Cited**

**U.S. PATENT DOCUMENTS**

- 4,103,273 7/1978 Keller ..... 338/2
- 4,121,334 10/1978 Wallis ..... 29/589

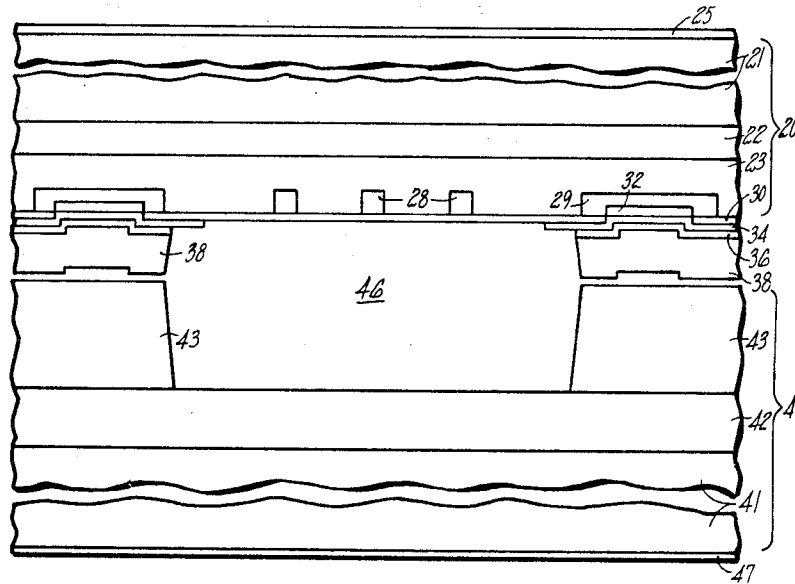
*Primary Examiner*—Brian E. Hearn  
*Assistant Examiner*—David A. Hey

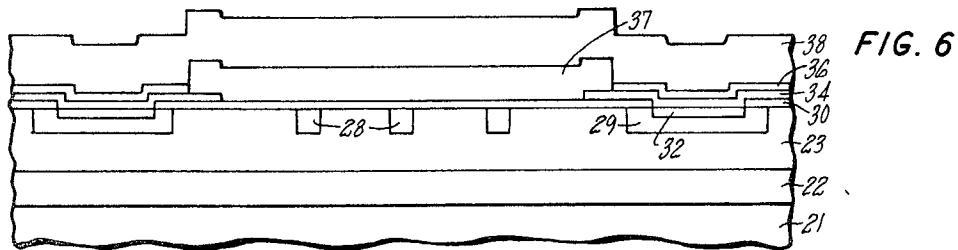
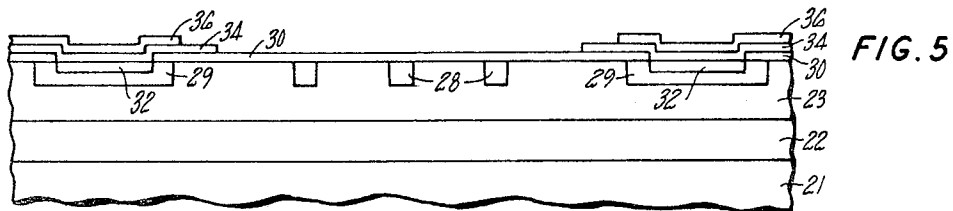
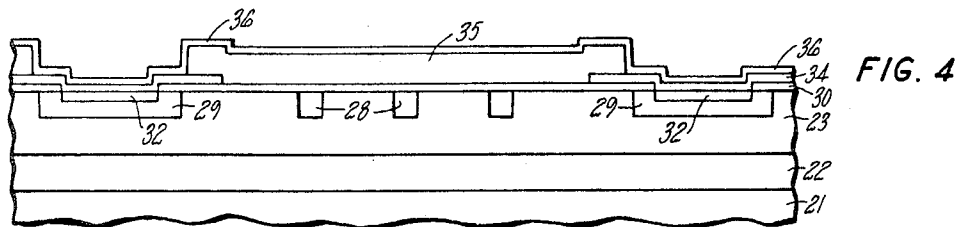
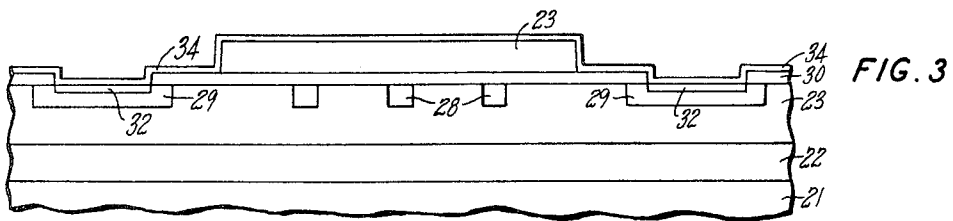
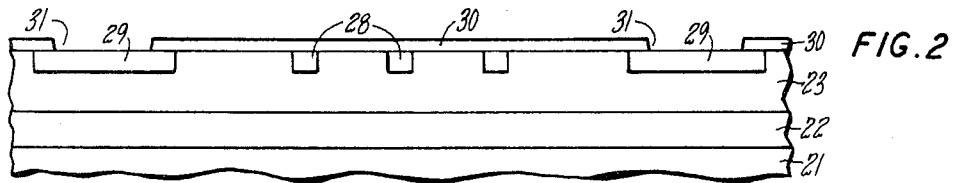
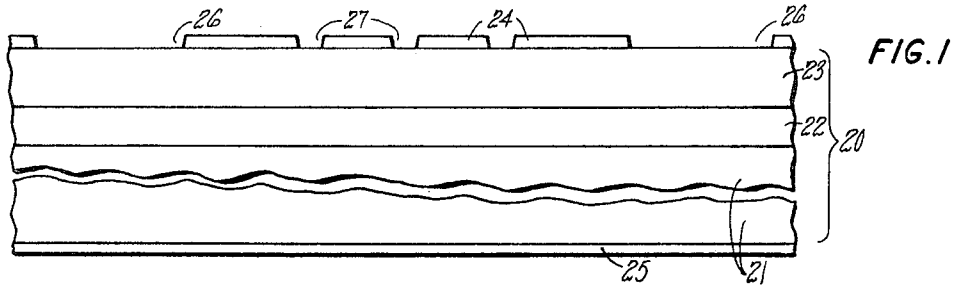
*Attorney, Agent, or Firm*—M. P. Williams

[57] **ABSTRACT**

A plurality of thin pressure sensors are made by processing a first large wafer (20, 110) to provide a plurality of electronic devices (28, 122, 124, 125) having a characteristic which varies inversely with strain, and processing a second wafer (40) to provide a plurality of cavities (46) each registered on the second wafer so as to be registerable with a corresponding device on the first wafer. The wafers (20, 40, 110) have thick undoped silicon substrates (21, 41, 114) which are utilized as handles or carriers during the processing, and are stripped off by etching to a highly doped boron etch stop layer (22, 42, 112) when the processing has proceeded to a point where the need therefore has been satisfied. The first wafers (20, 110) are provided with a suitable pattern of borosilicate glass (except in the region where the pressure sensors are formed) so that the two wafers may be joined by a field assisted bonding at a suitable temperature in a vacuum. Electric contact to the devices is provided by holes (51, FIG. 9; 56-59, FIG. 13) through the entire wafer.

**2 Claims, 13 Drawing Figures**





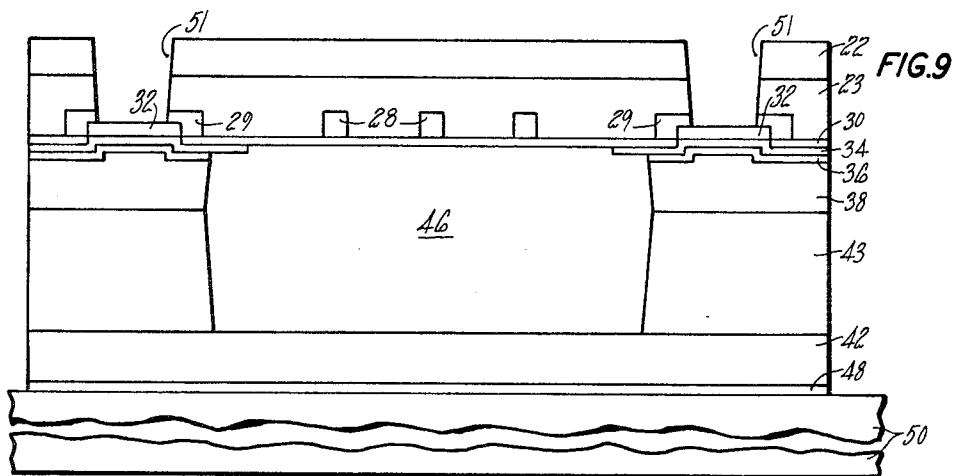
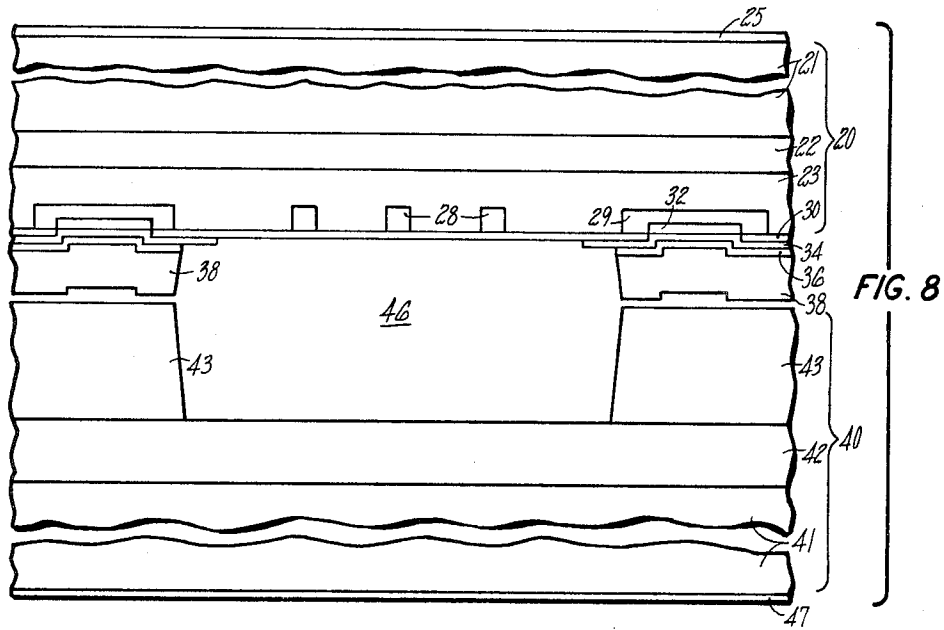
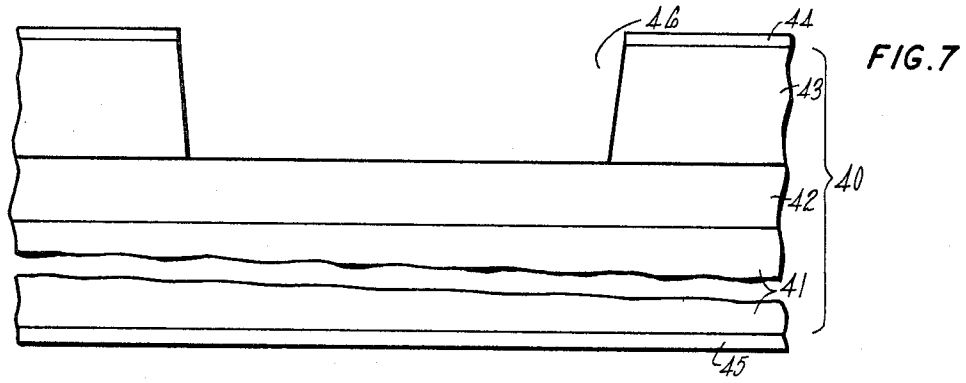
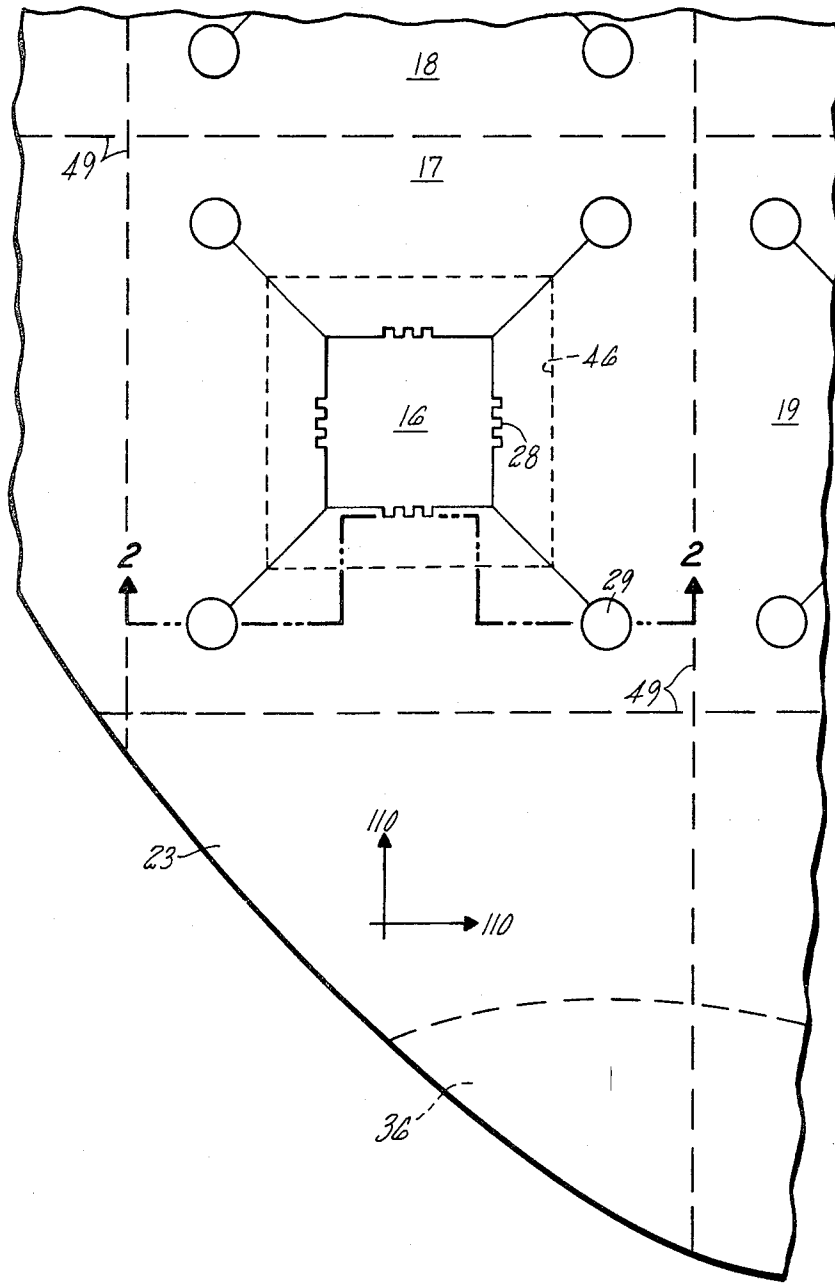
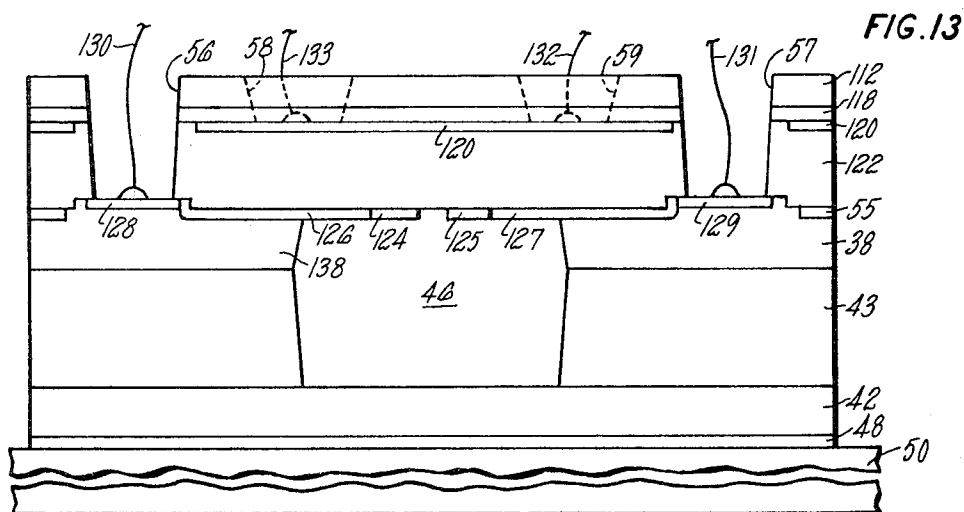
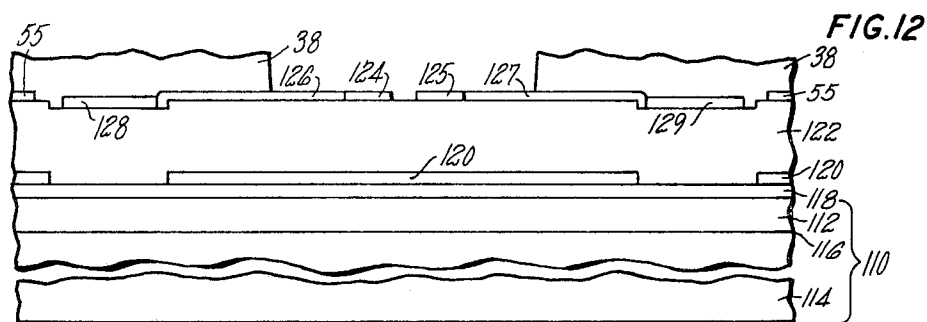
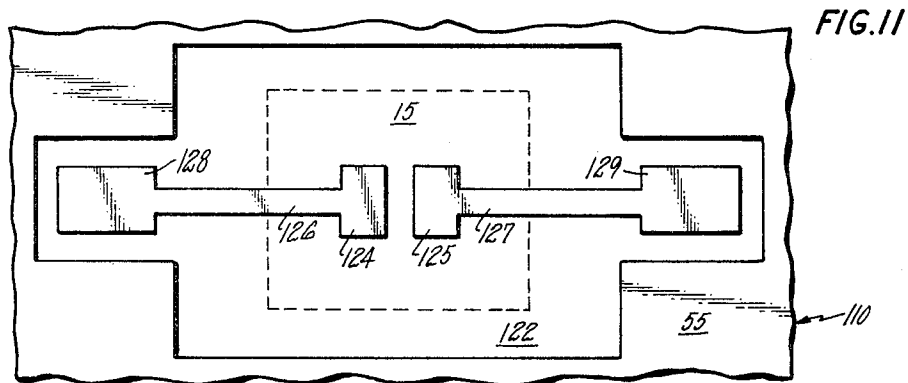


FIG. 10





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