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United States Patent [19]

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Caldwell

[45] Date of Patent: **Jan. 14, 1997**

[54] **TOUCH SENSOR AND CONTROL CIRCUIT THEREFOR**

[75] Inventor: **David W. Caldwell, Lapeer, Mich.**

[73] Assignee: **Integrated Controls, Lapeer, Mich.**

[21] Appl. No.: **328,852**

[22] Filed: **Oct. 25, 1994**

[51] Int. Cl.^o **H03K 17/975**

[52] U.S. Cl. **200/600; 341/33**

[58] Field of Search **200/5 A, 600; 361/278, 280; 307/116, 99; 341/22, 33, 26, 24; 345/173, 174; 400/479.1**

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Primary Examiner—J. R. Scott
Attorney, Agent, or Firm—Young & Basile, P.C.

[57] ABSTRACT

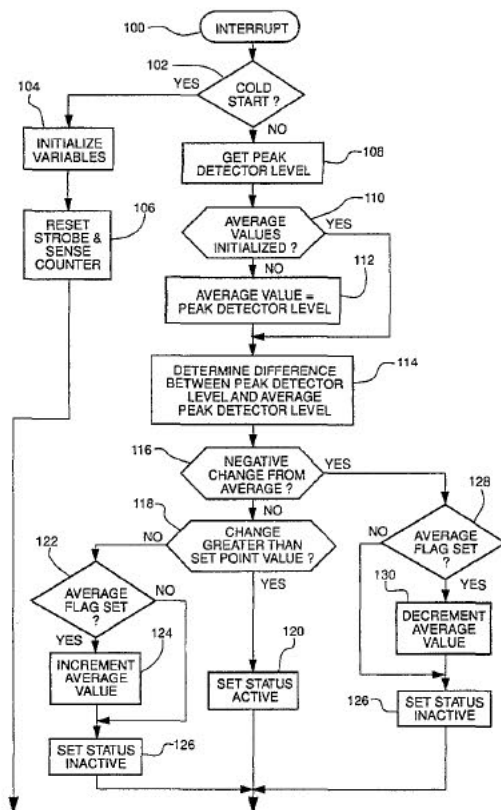
A low impedance touch sensor detects manual contact of a dielectric substrate by a human user. The touch sensor includes a first conductive electrode pad having a closed, continuous geometric form and a second conductive electrode which substantially co-planarly surrounds the first electrode and is spaced from the first electrode by a channel. The first and second electrodes are disposed on the same surface of the substrate. An active electrical component, such as a transistor is located on the substrate proximate the first and second electrodes, and is electrically coupled to the first and second electrodes.

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32 Claims, 6 Drawing Sheets



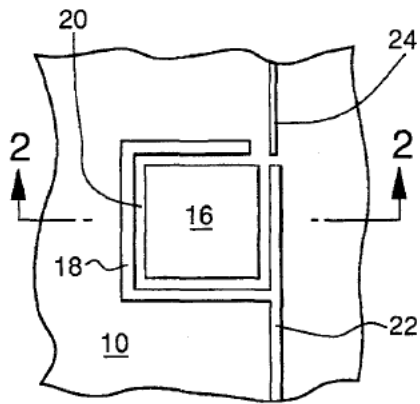


FIG - 1

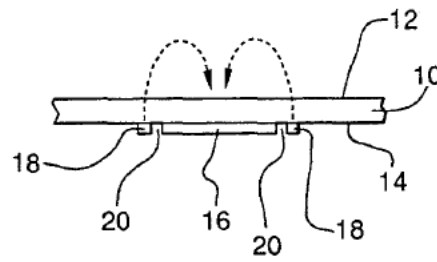


FIG - 2

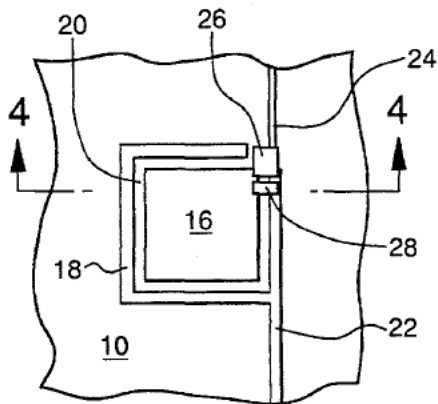


FIG - 3

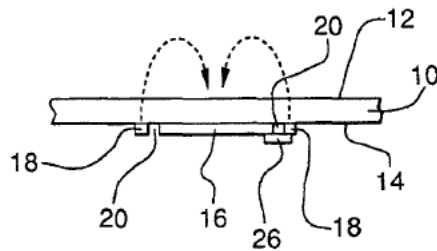


FIG - 4

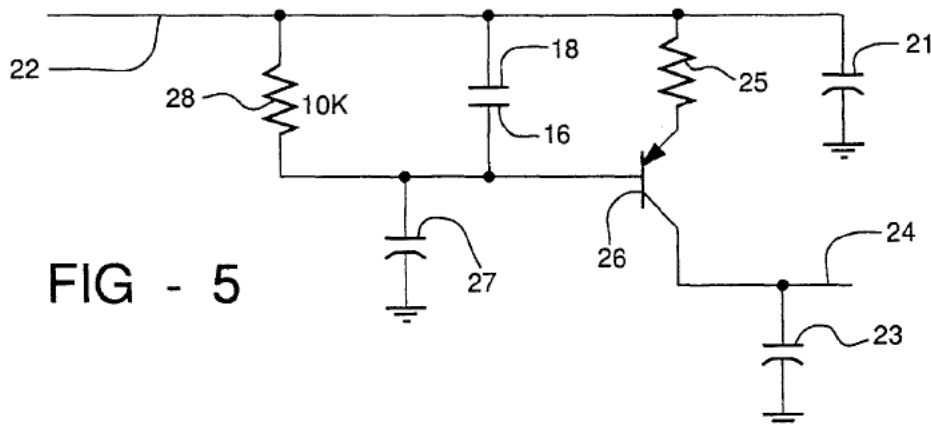


FIG - 5

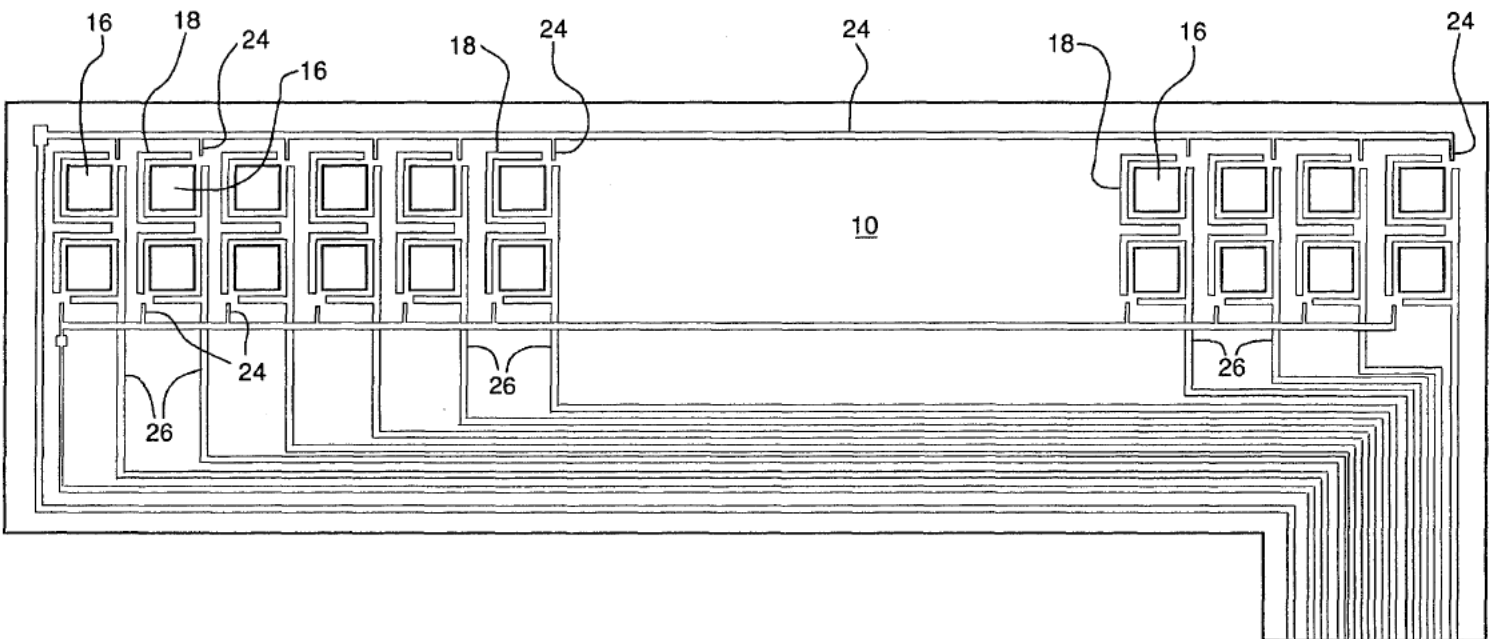


FIG - 6

FIG - 7

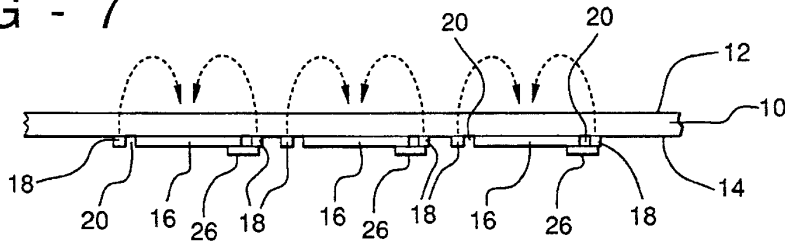


FIG - 8

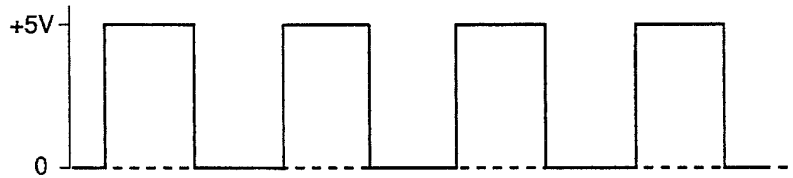


FIG - 9

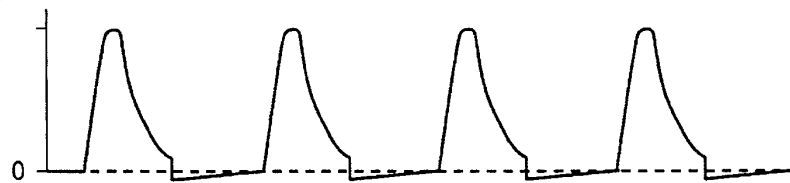


FIG - 10

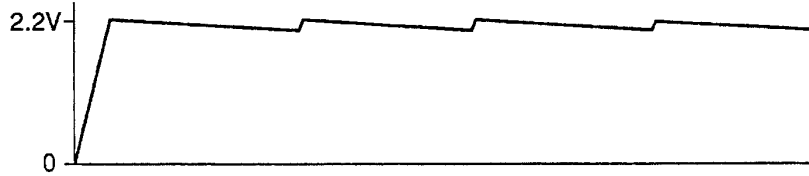


FIG - 11

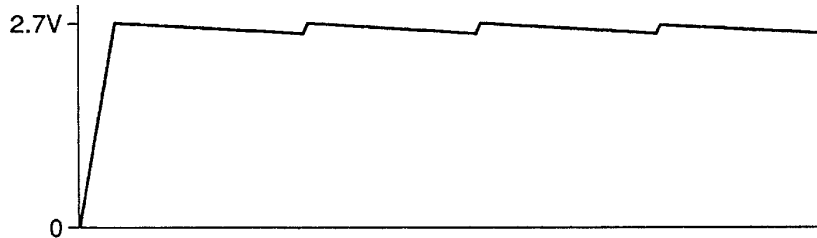


FIG - 12

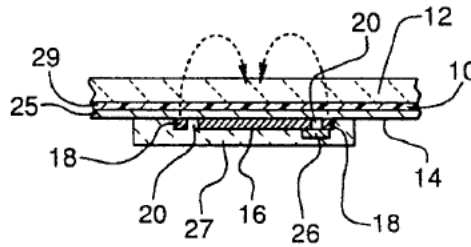
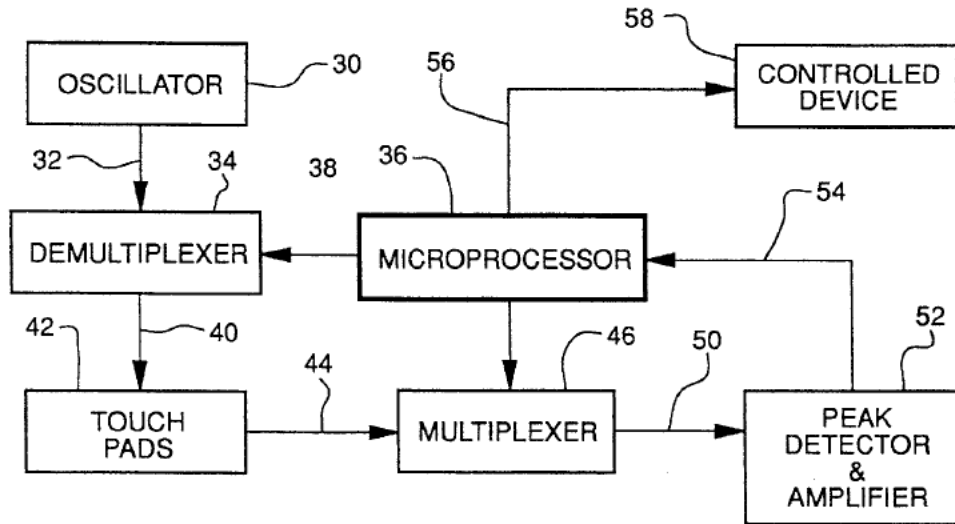


FIG - 13

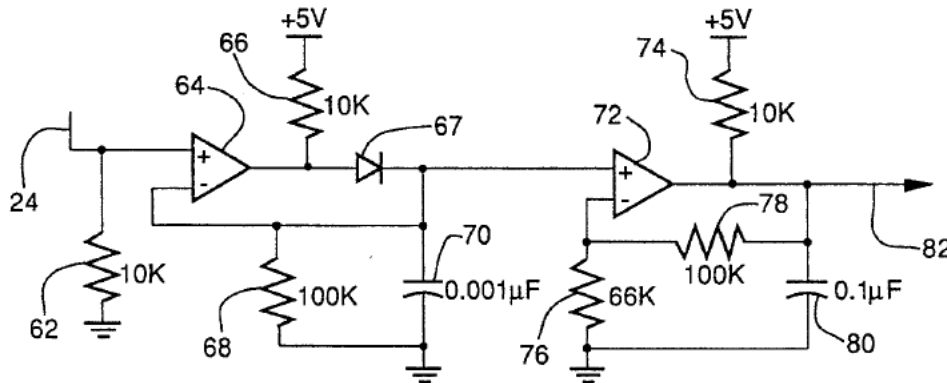


FIG - 4A

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