



US005760715A

# United States Patent [19]

[11] Patent Number: **5,760,715**

Senk et al.

[45] Date of Patent: **Jun. 2, 1998**

- [54] **PADLESS TOUCH SENSOR**
- [75] Inventors: **Miro Senk, St-Laurent; Pierre Repper, Châteauguay, both of Canada**
- [73] Assignee: **Pressenk Instruments Inc., St-Laurent, Canada**
- [21] Appl. No.: **843,365**
- [22] Filed: **Apr. 15, 1997**

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### Related U.S. Application Data

- [60] Provisional application No. 60/014,638 Apr. 15, 1996.
- [51] Int. Cl. <sup>6</sup> ..... **H03K 17/94; H03M 11/00**
- [52] U.S. Cl. .... **341/33; 200/600; 345/173; 345/174; 341/26; 341/34; 361/181; 178/18**
- [58] Field of Search ..... **200/600; 345/173, 345/174, 179; 341/26, 33, 34; 307/116, 109, 98, 99; 361/181; 178/17 C, 17 D, 18**

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*Assistant Examiner*—Timothy Edwards, Jr.  
*Attorney, Agent, or Firm*—Merchant, Gould, Smith Edell, Welter & Schmidt

### [57] ABSTRACT

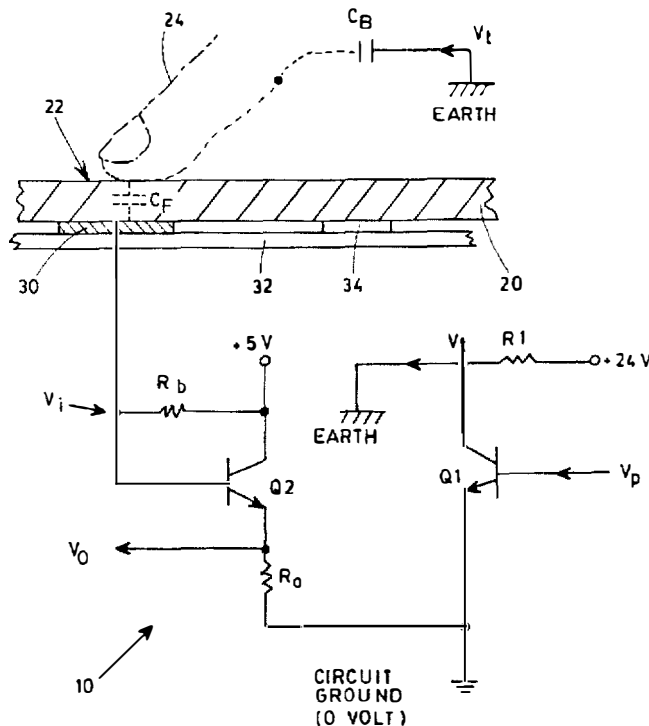
The padless touch sensor is used for detecting a touch at a sensing location onto a dielectric element by a user coupled to earth. The sensor comprises a conductive plate attached under the dielectric element and in registry with the sensing location. A predetermined potential is applied on the conductive plate. Simultaneously, test pulses are produced into earth. When the user touches the dielectric element at the sensing location, a potential variation in the conductive plate is produced during a test pulse due to a capacitive circuit formed between earth, the user and the sensor. No deposition of conductive pads on the dielectric element or other special processes are required. Foreign matter or objects placed directly on top of the dielectric element will not erroneously produce a touch condition.

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**18 Claims, 10 Drawing Sheets**



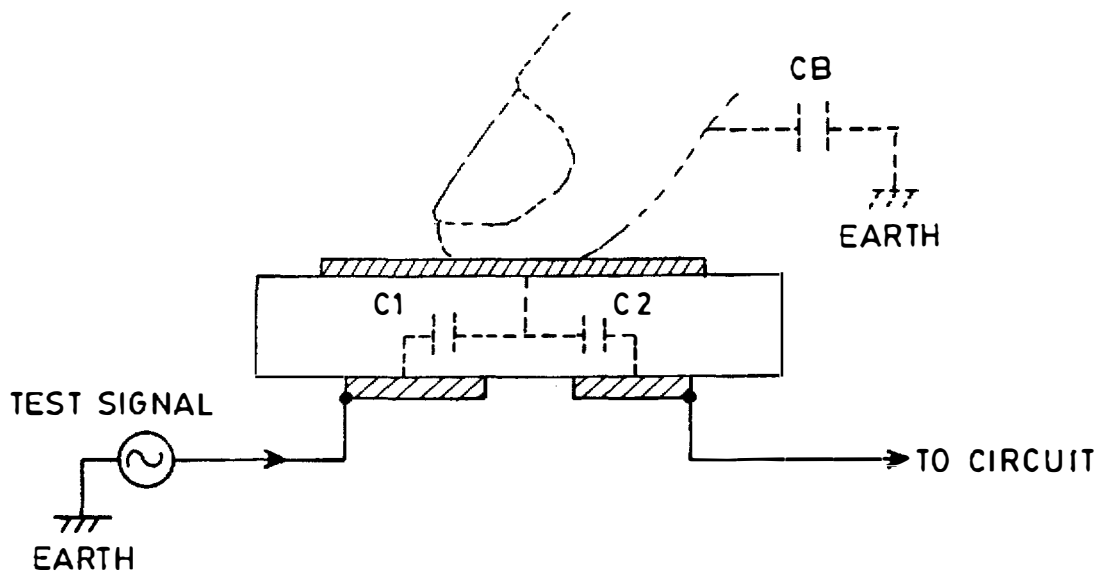


FIG. 1  
(PRIOR ART)

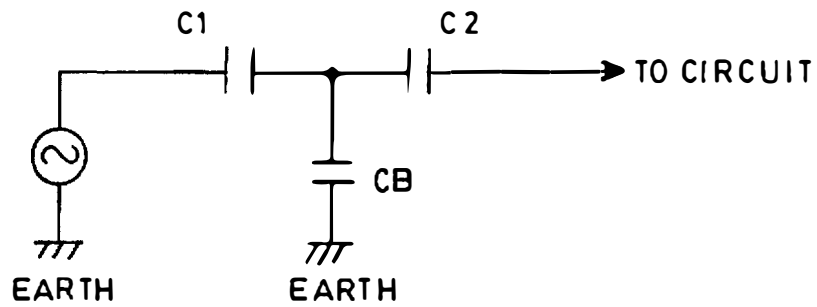


FIG. 2  
(PRIOR ART)

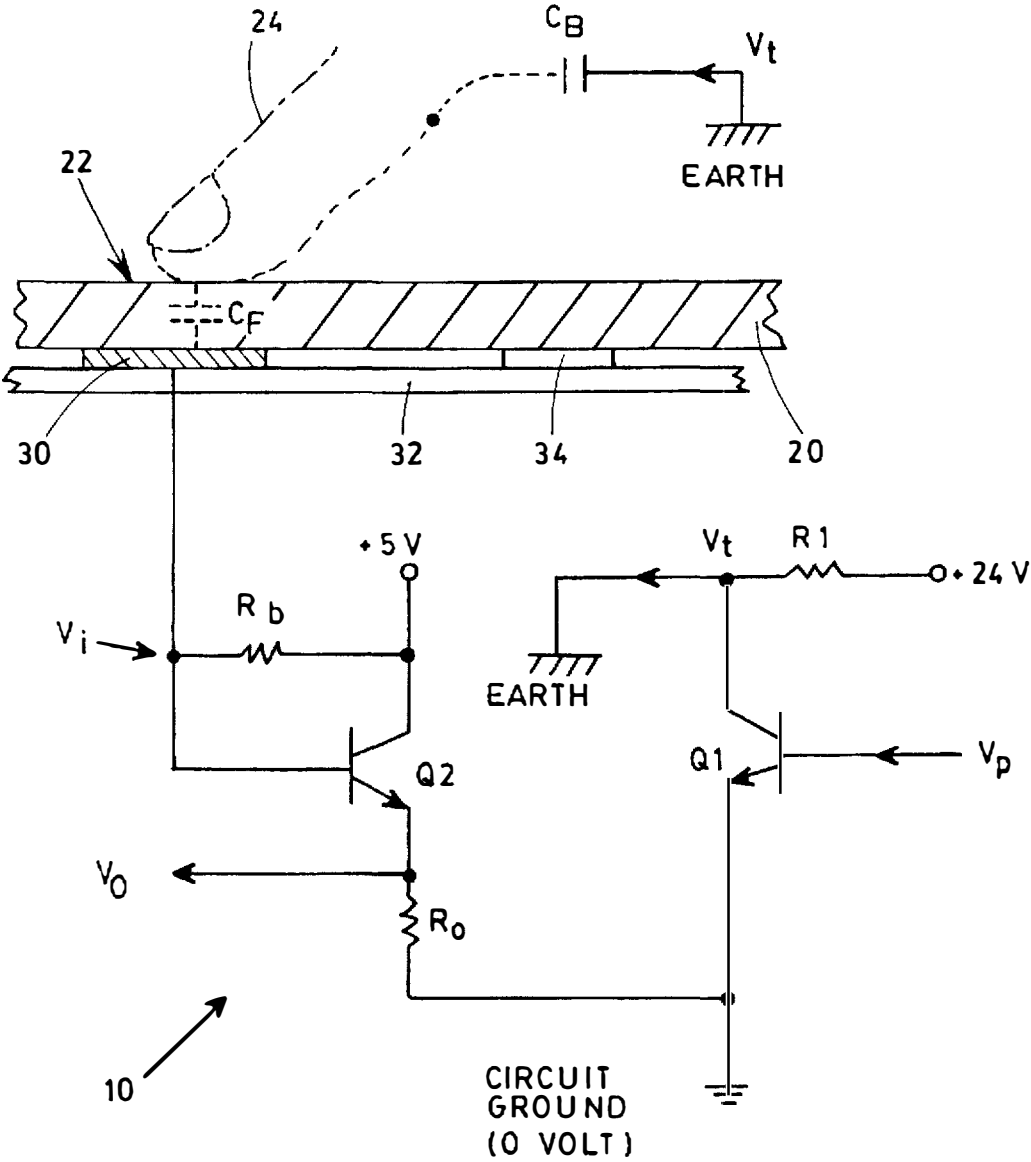


FIG. 3

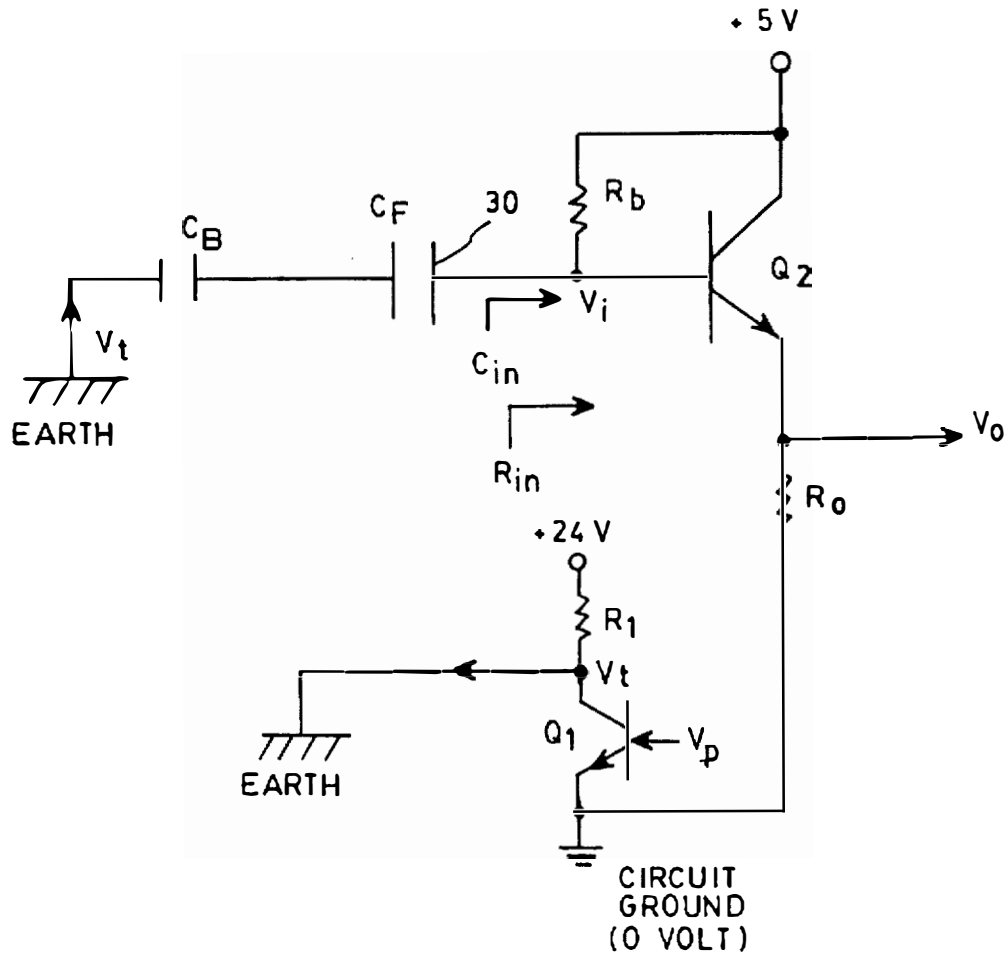


FIG. 4

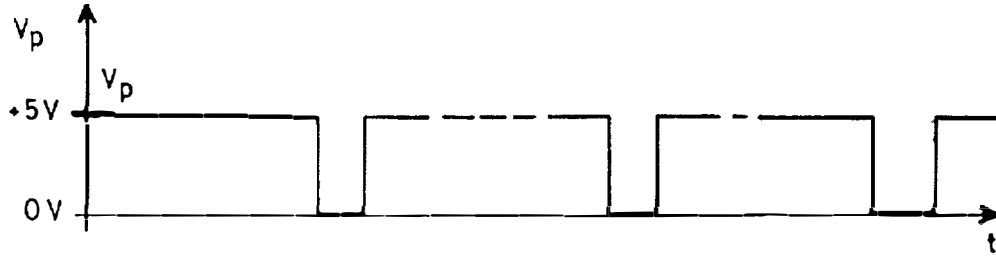


FIG. 5 (A)



FIG. 5 (B)

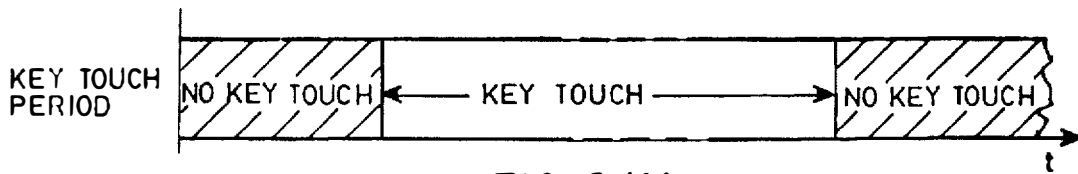


FIG. 5 (C)

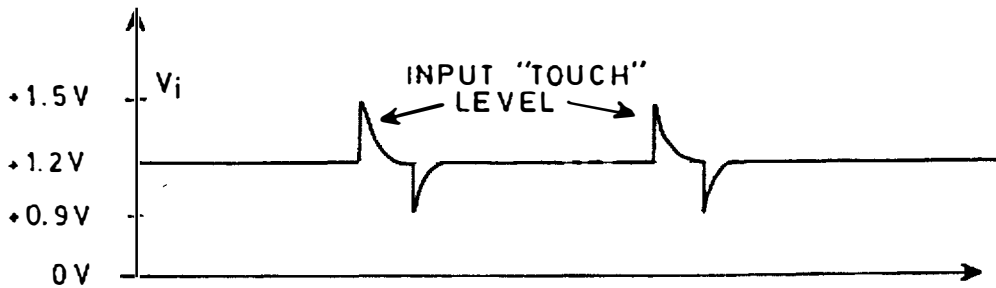


FIG. 5 (D)

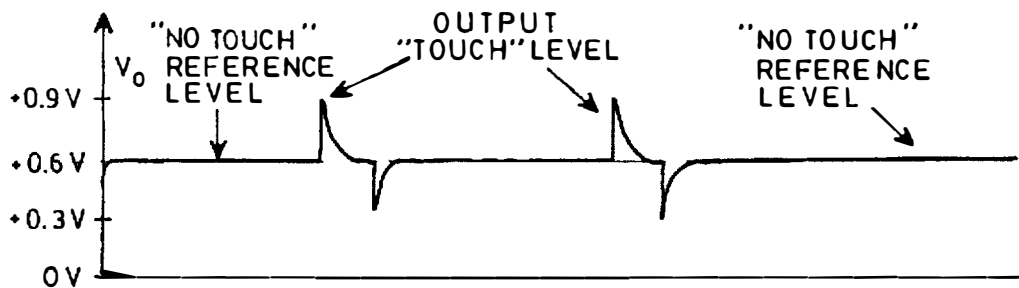


FIG. 5 (E)

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