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# United States Patent [19] Binstead

[11] **Patent Number:** **6,137,427**  
[45] **Date of Patent:** **\*Oct. 24, 2000**

[54] **MULTIPLE INPUT PROXIMITY DETECTOR AND TOUCHPAD SYSTEM**

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### FOREIGN PATENT DOCUMENTS

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[\*] Notice: This patent is subject to a terminal disclaimer.

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[21] Appl. No.: **09/179,489**

### [57] ABSTRACT

[22] Filed: **Oct. 27, 1998**

### Related U.S. Application Data

[63] Continuation of application No. 08/718,356, Oct. 3, 1996, Pat. No. 5,844,506, which is a continuation of application No. PCT/GB95/00767, Apr. 5, 1995.

A touchpad is formed of an electrically insulating membrane (10) with a first series of spaced apart conductors (12) on a first face of membrane (10) and a second series of spaced apart conductors (14) on or proximal thereto, in which there is no electrical contact between the first and second series of conductors (12, 14). Each conductor in the first and second series of conductors is sensitive to the proximity of a finger to modify the capacitance of the proximate conductor to detect the presence of the finger positioned close to that conductor. A scanning system operative to sample one of the conductors in turn from both the first and second series of conductors (12, 14) in order to measure and store a capacitance value associated with that respective conductor. The scanning system is operative to maintain all conductors (12-n, 14-n) at a common potential equal to the potential of the conductor being sampled when the remaining conductors are not actively being sampled by the scanning system.

### [30] Foreign Application Priority Data

Apr. 5, 1994 [GB] United Kingdom ..... 9406702

[51] **Int. Cl.<sup>7</sup>** ..... **H03K 17/94**

[52] **U.S. Cl.** ..... **341/33; 341/34; 345/173; 345/174**

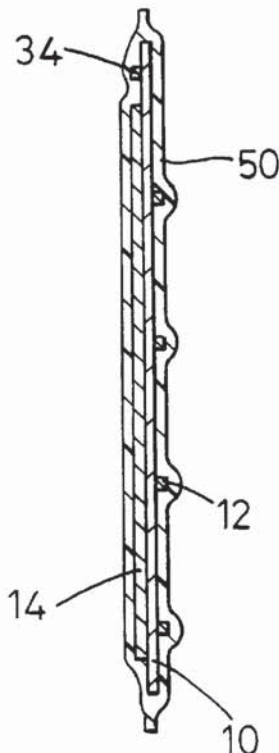
[58] **Field of Search** ..... **341/33, 34, 20; 345/173, 174**

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**25 Claims, 9 Drawing Sheets**



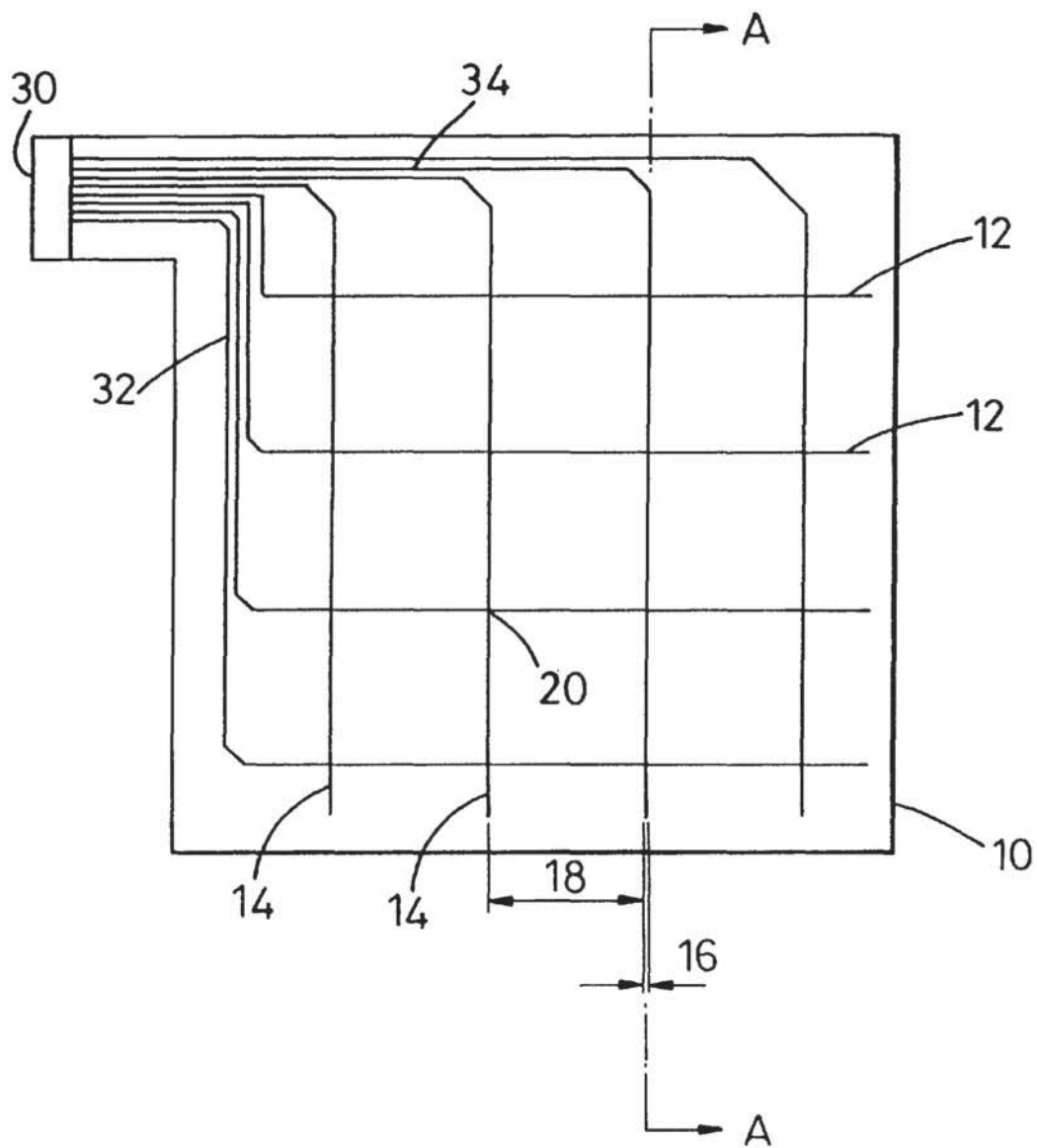


Fig. 1

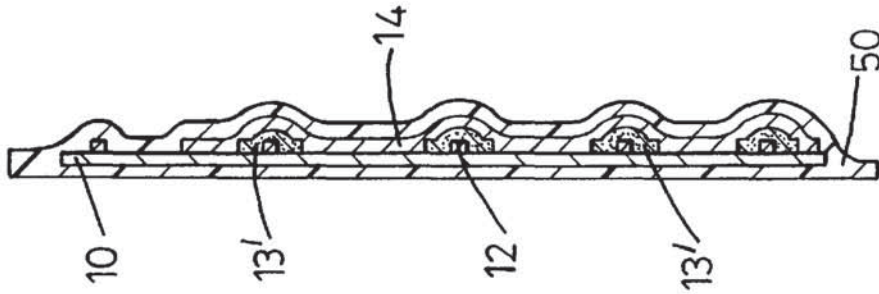


Fig. 2c

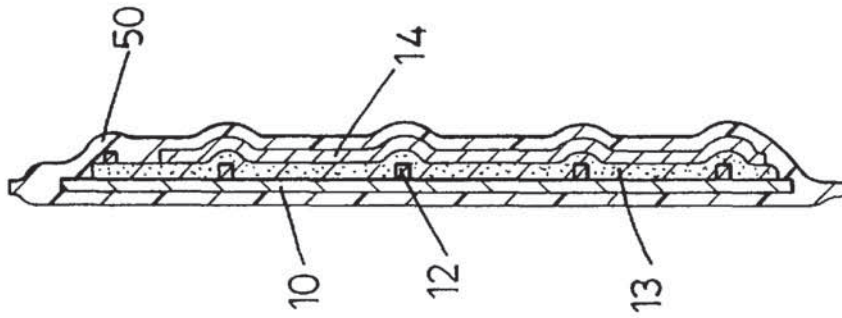


Fig. 2b

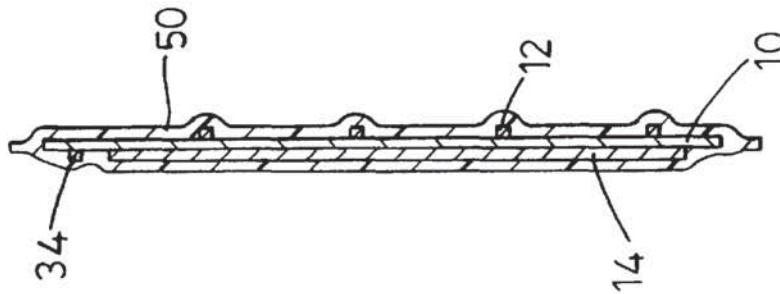


Fig. 2a

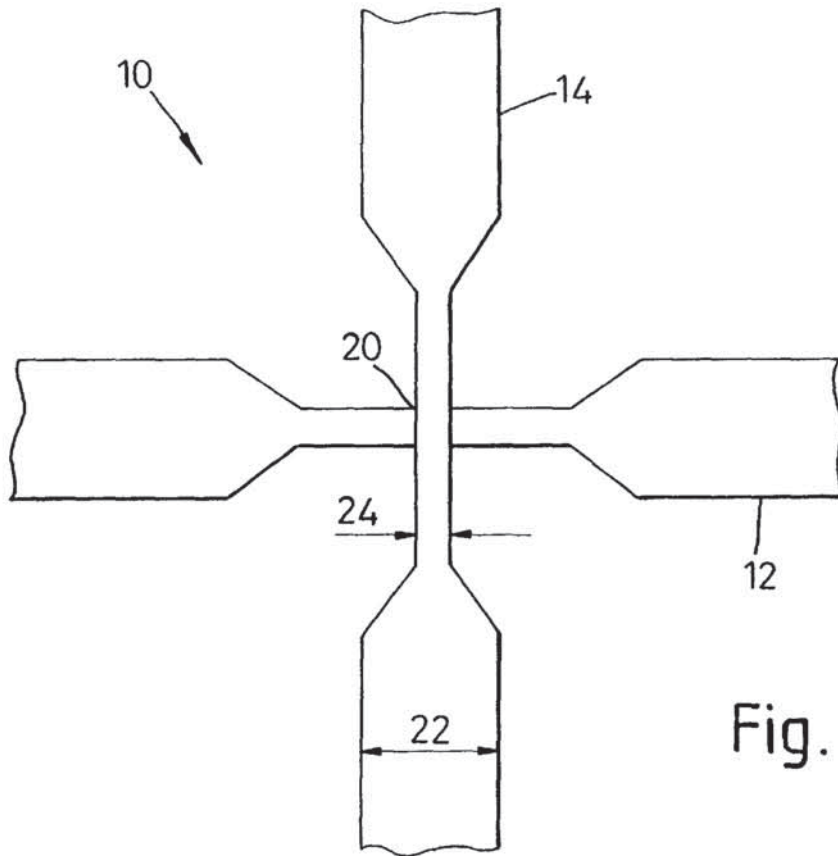


Fig. 3a

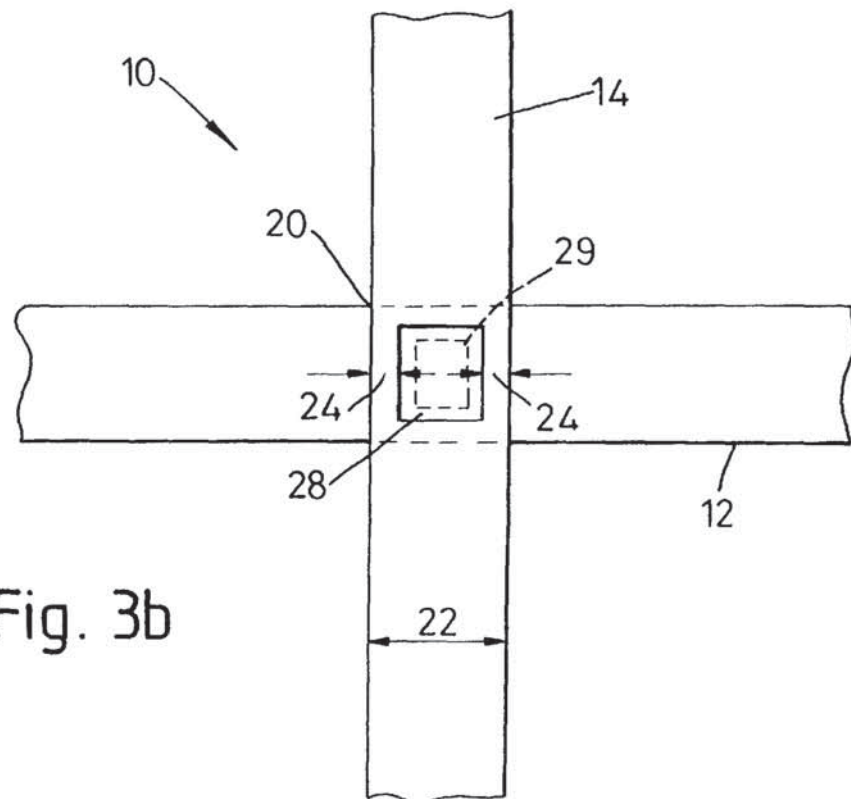
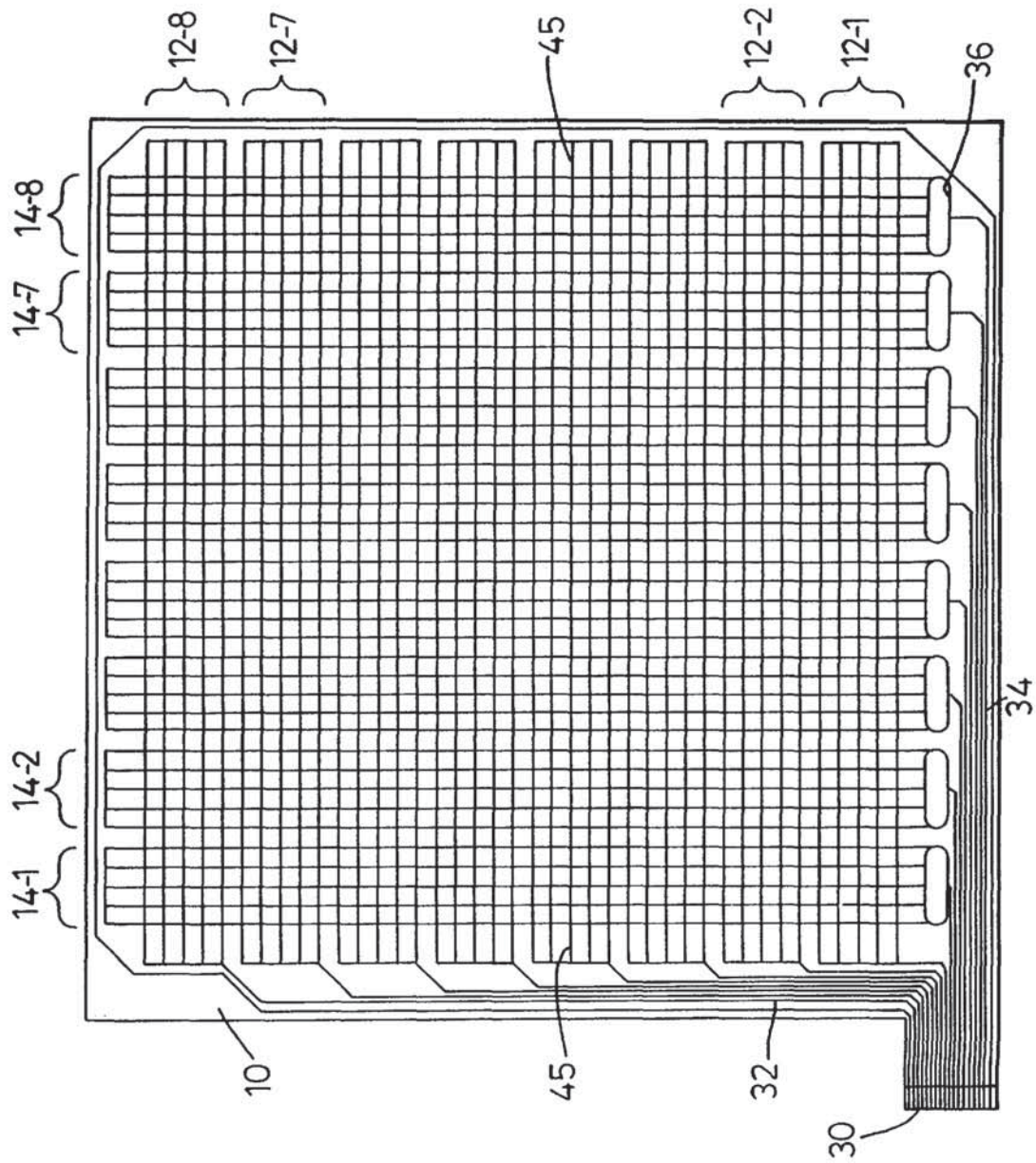


Fig. 3b

Fig. 4



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