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Hristov

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(54) **TWO-DIMENSIONAL POSITION SENSOR**

2007/0008299 A1 1/2007 Hristov

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(73) Assignee: **Atmel Corporation**, San Jose, CA (US)

EP 0609021 A 8/1994

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 912 days.

OTHER PUBLICATIONS

(21) Appl. No.: **11/428,670**

IBM Technical Disclosure Bulletin, vol. 21, No. 10, Mar. 1979, N. D. Lupat et al. "One layer optically transparent keyboard for input display", p. 3904 to 3906.

(22) Filed: **Jul. 5, 2006**

"Chinese Application Serial No. 200610143149.0 Office Action Mailed Oct. 9, 2009", 6 pgs.

(65) **Prior Publication Data**

200610143149.0, "Chinese Application Serial No. 200610143149.0, Office Action mailed Apr. 10, 2009", 8 pgs.

US 2007/0008299 A1 Jan. 11, 2007

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Related U.S. Application Data

Primary Examiner—Srilakshmi K Kumar

(60) Provisional application No. 60/697,613, filed on Jul. 8, 2005.

(74) *Attorney, Agent, or Firm*—Schwegman, Lundberg & Woessner, P.A.

(51) **Int. Cl.**

G06F 3/041 (2006.01)

G06F 3/044 (2006.01)

(52) **U.S. Cl.** **345/173; 178/18.06**

(58) **Field of Classification Search** **345/156, 345/173-178; 178/18.01, 18.06**

See application file for complete search history.

(57) **ABSTRACT**

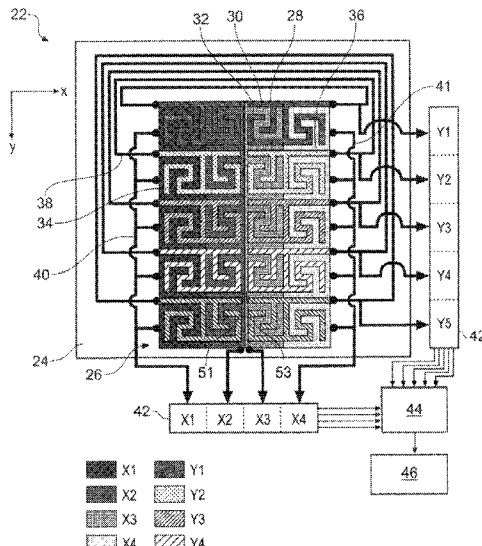
A capacitive position sensor for determining the position of an object along first and second directions is described. The sensor comprises a substrate having an arrangement of electrodes mounted on a single surface thereof. The electrodes are arranged so as to define an array of sensing cells arranged in columns and rows to form a sensing area. Each of the sensing cell including a column sensing electrode and a row sensing electrode with the column sensing electrodes of sensing cells in the same column being electrically coupled together and the row sensing electrodes of sensing cells in the same row also being electrically coupled together. Row sensing electrodes of sensing cells at opposing ends of at least one of the rows are connected together by an electrical connection made outside of the sensing area so that there is no requirement for electrical connections to cross within the sensing area, thus providing a capacitive position sensor having a sensing area with electrodes on only one side of a substrate.

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24 Claims, 8 Drawing Sheets



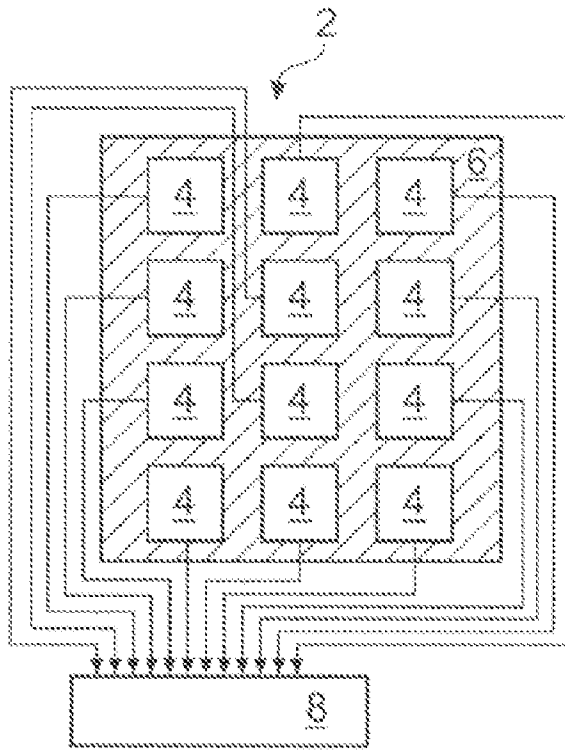


Fig. 1 (PRIOR ART)

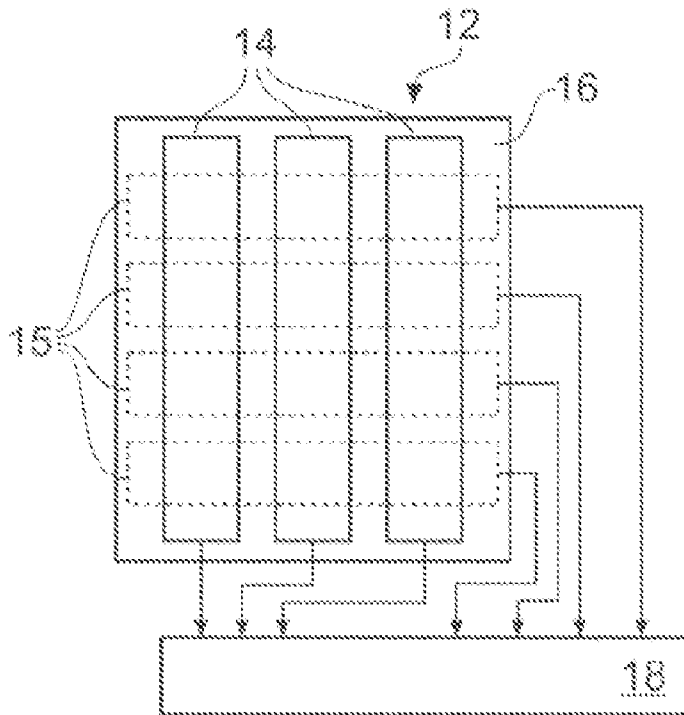


Fig. 2 (PRIOR ART)

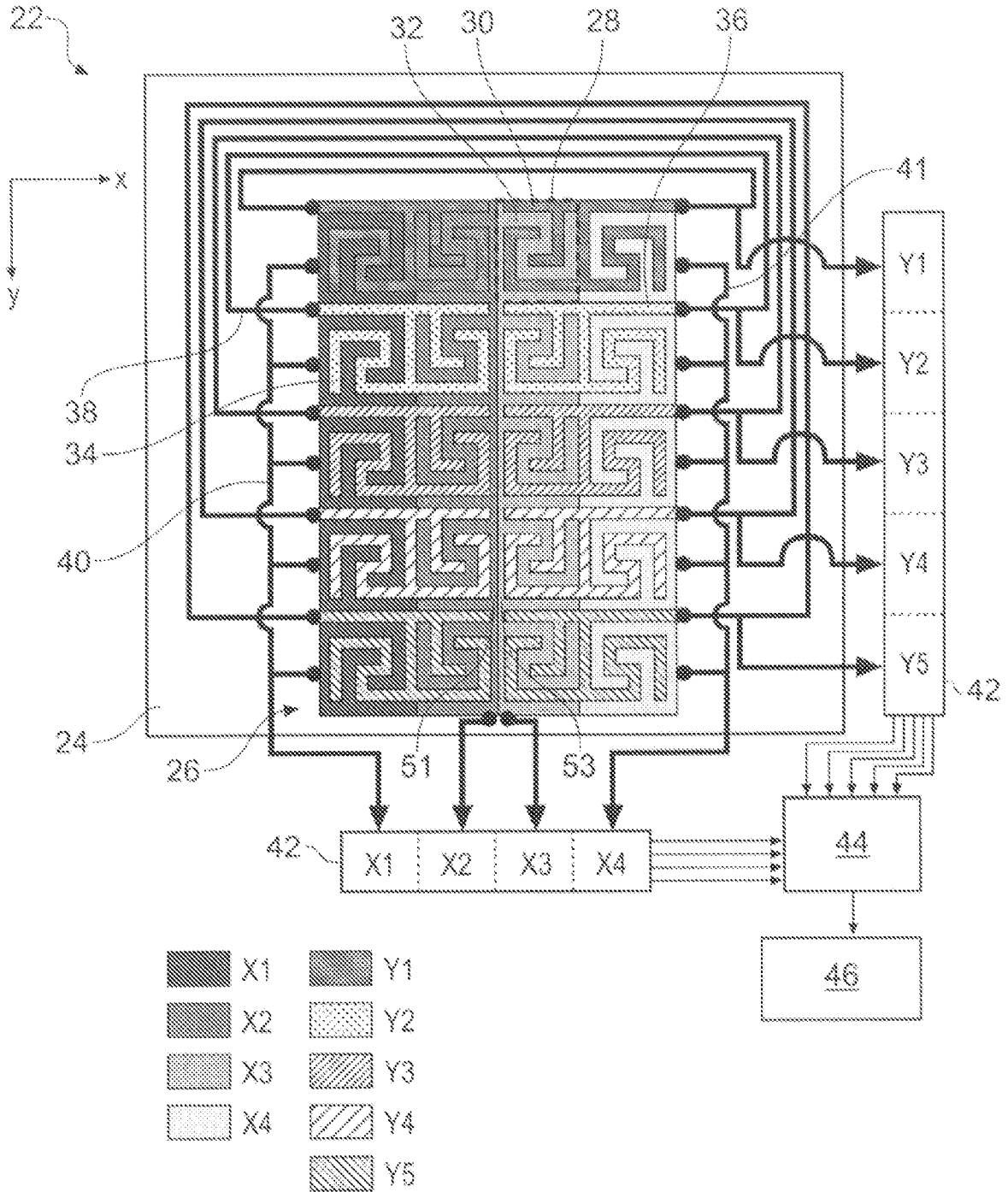


Fig. 3

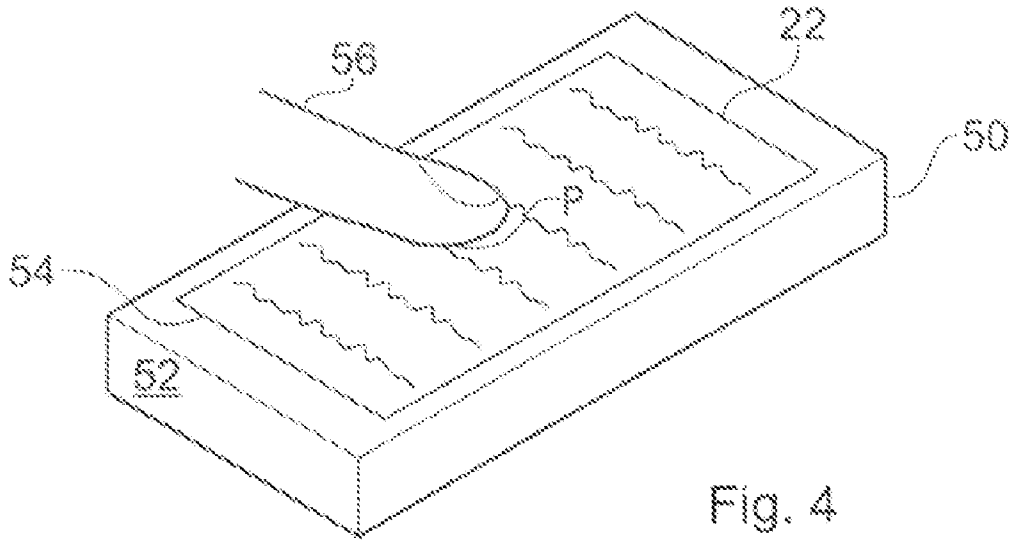


Fig. 4

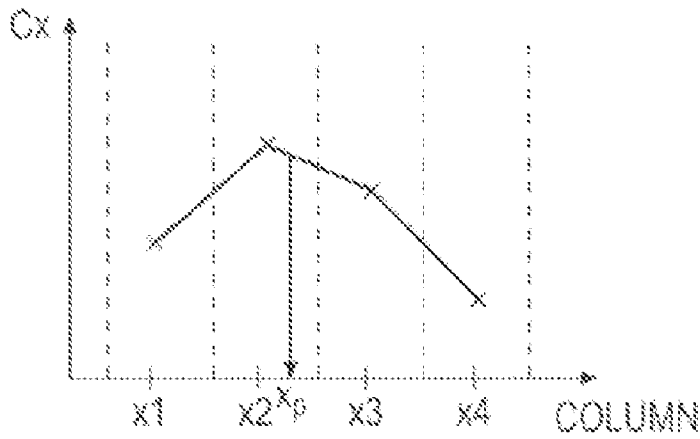


Fig. 5A

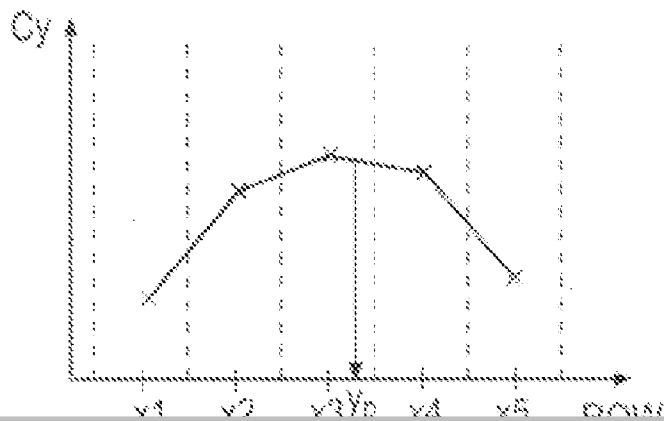


Fig. 5B

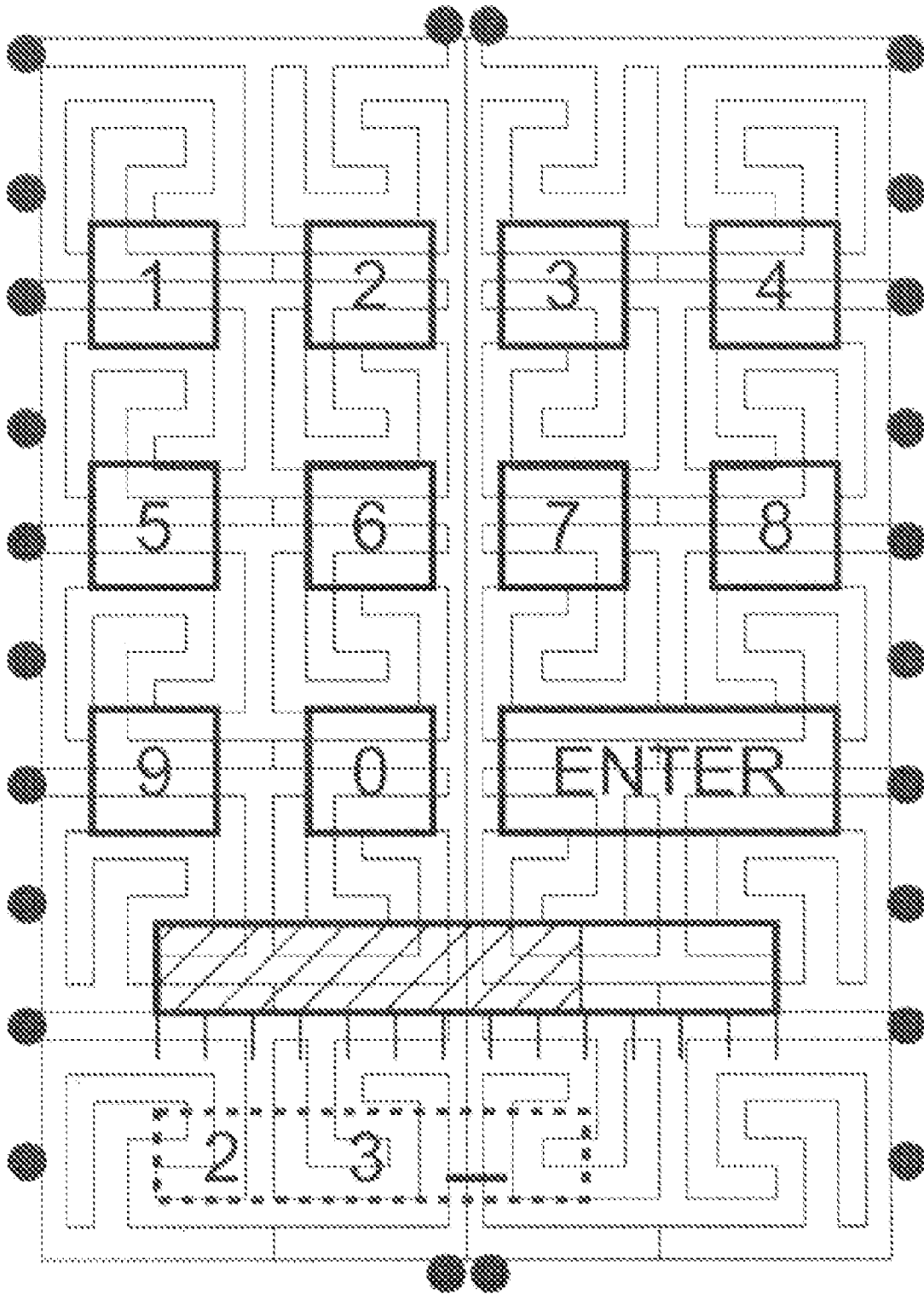


FIG. 6

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