US008432173B2

(12) **United States Patent**
Philipp

(10) **Patent No.: US 8,432,173 B2**
(45) **Date of Patent: Apr. 30, 2013**

(54) **CAPACITIVE POSITION SENSOR**

(75) Inventor: **Harald Philipp**, Zug (CH)

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

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/118,280**

(22) Filed: **May 27, 2011**

(65) **Prior Publication Data**

US 2011/0227589 A1 Sep. 22, 2011

Related U.S. Application Data

(63) Continuation of application No. 12/703,614, filed on Feb. 10, 2010, now Pat. No. 7,952,367, which is a continuation of application No. 11/868,566, filed on Oct. 8, 2007, now abandoned.

(60) Provisional application No. 60/862,358, filed on Oct. 20, 2006.

(51) **Int. Cl.**
G01R 27/26 (2006.01)

(52) **U.S. Cl.**
USPC **324/686**; 324/667

(58) **Field of Classification Search** 324/667, 324/676–690
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,121,204	A	10/1978	Welch et al.
4,264,903	A	4/1981	Bigelow
7,663,607	B2	2/2010	Hotelling
7,875,814	B2	1/2011	Chen
7,920,129	B2	4/2011	Hotelling
8,031,094	B2	10/2011	Hotelling
8,031,174	B2	10/2011	Hamblin
8,040,326	B2	10/2011	Hotelling
8,049,732	B2	11/2011	Hotelling
8,179,381	B2	5/2012	Frey
2003/0043174	A1	3/2003	Hinckley et al.
2004/0027395	A1	2/2004	Lection et al.
2004/0196267	A1	10/2004	Kawai et al.
2004/0207605	A1	10/2004	Mackey

(Continued)

FOREIGN PATENT DOCUMENTS

DE	19645907	A1	5/1998
DE	19903300	A1	8/1999

(Continued)

OTHER PUBLICATIONS

UK Intellectual Property Office, Combined Search and Examination Report in Corresponding UK application, Feb. 22, 2008.

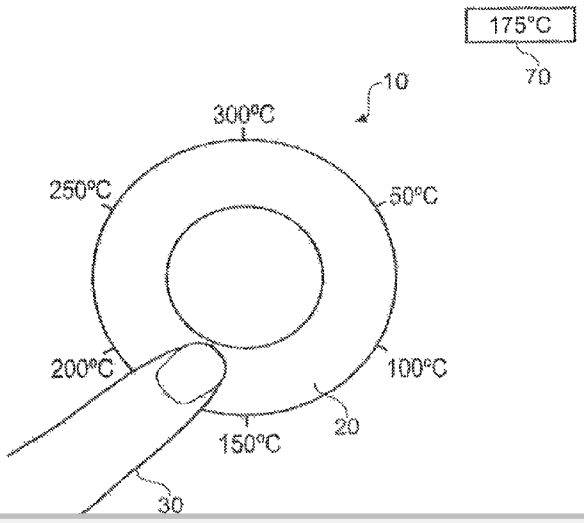
(Continued)

Primary Examiner — Vincent Q Nguyen
(74) *Attorney, Agent, or Firm* — Baker Botts L.L.P.

(57) **ABSTRACT**

In one embodiment, a method includes receiving one or more first signals indicating one or more first capacitive couplings of an object with a sensing element that comprises a sensing path that comprises a length. The first capacitive couplings correspond to the object coming into proximity with the sensing element at a first position along the sensing path of the sensing element. The method includes determining based on one or more of the first signals the first position of the object along the sensing path and setting a parameter to an initial value based on the first position of the object along the sensing path. The initial value includes a particular parameter value and is associated with a range of parameter values. The range of parameter values is associated with the length of the sensing path.

19 Claims, 4 Drawing Sheets



U.S. PATENT DOCUMENTS

2005/0052429	A1	3/2005	Philipp
2005/0078027	A1	4/2005	Philipp
2006/0016800	A1	1/2006	Paradiso et al.
2008/0094077	A1	4/2008	Philipp
2009/0051660	A1	2/2009	Feland et al.
2009/0115431	A1	5/2009	Philipp
2009/0315854	A1	12/2009	Matsuo
2012/0242588	A1	9/2012	Myers
2012/0242592	A1	9/2012	Rothkopf
2012/0243151	A1	9/2012	Lynch
2012/0243719	A1	9/2012	Franklin

FOREIGN PATENT DOCUMENTS

DE	10133135	A1	1/2003
DE	10313401	A1	10/2004
DE	212004000044	U1	6/2006
DE	102005002952	A1	7/2006
DE	102005018298	A1	10/2006
EP	1273851	A2	1/2003
EP	1602882	A1	12/2005
GB	2443296	A	4/2008
WO	2003088176	A1	10/2003
WO	2006133976	A1	12/2006
WO	2007006624	A1	1/2007
WO	2007023067	A1	3/2007
WO	2007072294	A1	6/2007
WO	2010075463	A4	9/2010
WO	WO 2012/129247		9/2012

OTHER PUBLICATIONS

U.S. Appl. No. 11/868,566, Non-Final Office Action mailed Oct. 1, 2009, 19 pages.
U.S. Appl. No. 12/317,305, Non-Final Office Action mailed Oct. 1, 2009, 15 pages.
U.S. Appl. No. 12/317,305, Interview Summary and Supplemental Office Action mailed Feb. 9, 2010, 12 pages.
U.S. Appl. No. 12/317,305, Response filed Mar. 1, 2010 to Non-Final Office Action mailed Oct. 1, 2009 and the Supplemental Office Action mailed Feb. 9, 2010, 14 pages.
U.S. Appl. No. 12/317,305, Notice of Allowance mailed Apr. 12, 2010, 7 pages, Apr. 4, 2010.
International Application Serial No. PCT/US2009/069322, International Search Report mailed May 7, 2010, 3 pages.
International Application Serial No. PCT/US2009/069322, Written Opinion mailed May 7, 2010, 5 pages.
German Application Serial No. 102007049559.7, Office Action mailed Jan. 4, 2011, 10 pages.
U.S. Appl. No. 61/454,936, filed Mar. 21, 2011, Myers.
U.S. Appl. No. 61/454,950, filed Mar. 21, 2011, Lynch.
U.S. Appl. No. 61/454,894, filed Mar. 21, 2011, Rothkopf.

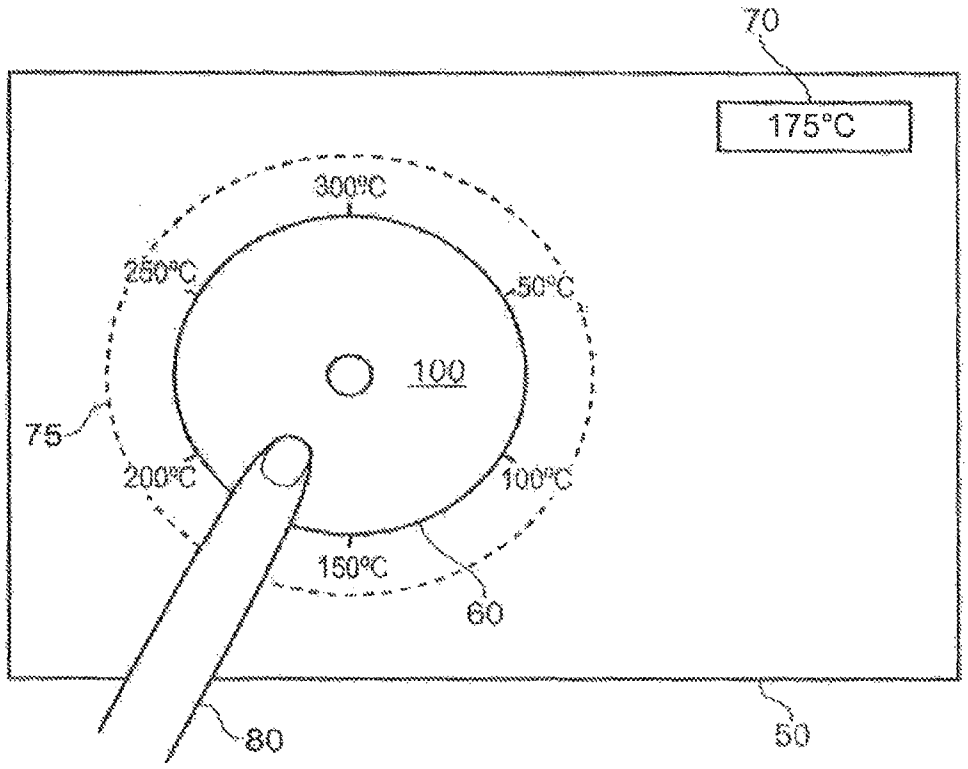


FIG. 1

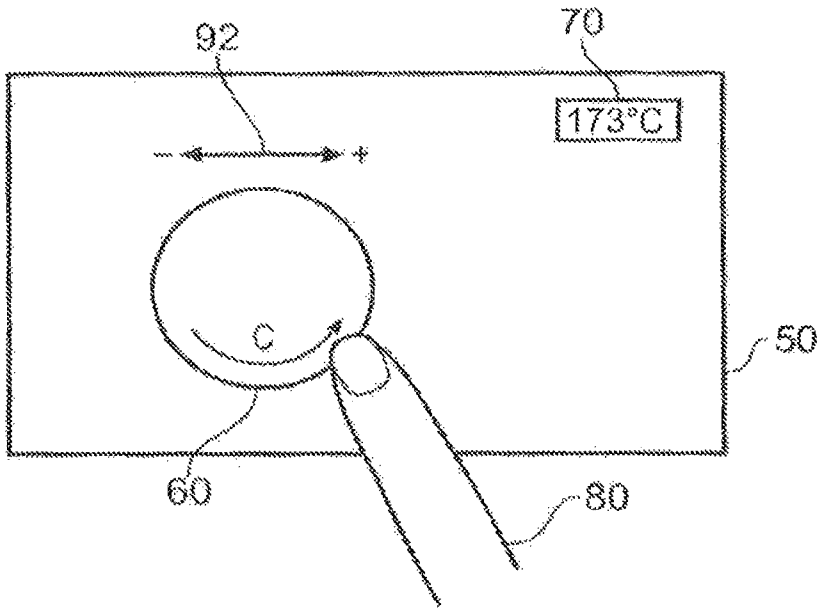


FIG. 2A

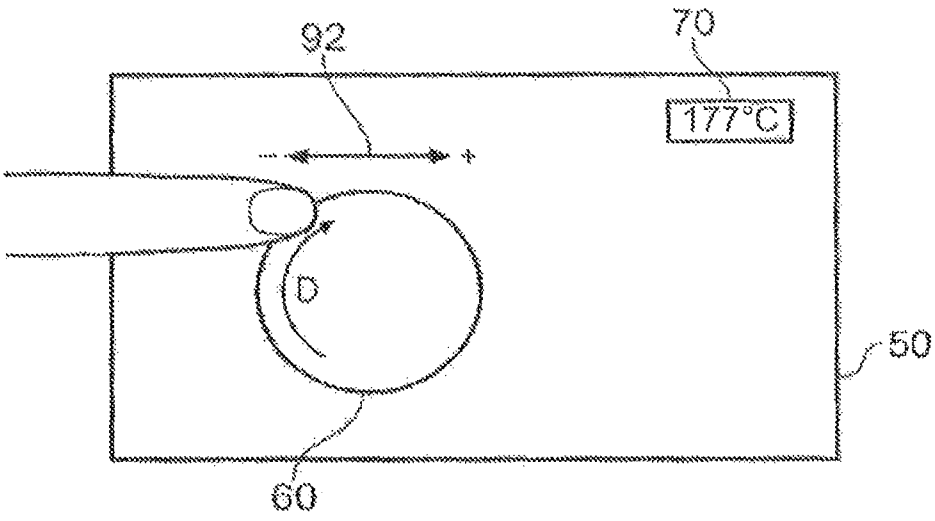


FIG. 2B

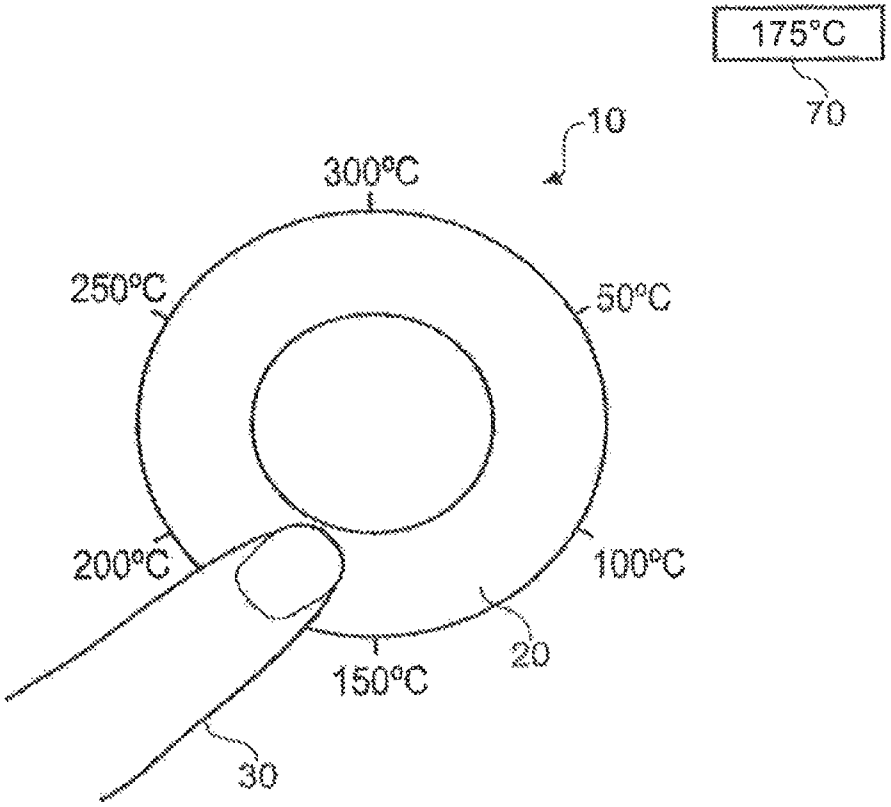


FIG. 3

DOCKET ALARM

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.