

EXHIBIT 3



US007450206B2

(12) **United States Patent**
Nakahata et al.

(10) **Patent No.:** **US 7,450,206 B2**
 (45) **Date of Patent:** **Nov. 11, 2008**

(54) **LIQUID CRYSTAL DISPLAY DEVICE AND METHOD OF FABRICATING THE SAME**

(75) Inventors: **Yuji Nakahata**, Kawasaki (JP); **Yoji Taniguchi**, Kawasaki (JP); **Tetsuya Fujikawa**, Kawasaki (JP)

(73) Assignee: **Sharp Kabushiki Kaisha**, Osaka (JP)

(*) 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.: **10/893,790**

(22) Filed: **Jul. 16, 2004**

(65) **Prior Publication Data**

US 2005/0024556 A1 Feb. 3, 2005

Related U.S. Application Data

(60) Division of application No. 10/263,257, filed on Oct. 2, 2002, now Pat. No. 6,778,229, which is a continuation-in-part of application No. 10/107,989, filed on Mar. 27, 2002, now abandoned.

(30) **Foreign Application Priority Data**

Oct. 2, 2001 (JP) 2001-306906
 May 10, 2002 (JP) 2002-136128

(51) **Int. Cl.**

G02F 1/1337 (2006.01)
G02F 1/1343 (2006.01)

(52) **U.S. Cl.** 349/129; 349/39

(58) **Field of Classification Search** 349/143,
 349/129, 39, 38

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,073,772 A 12/1991 Takafuji et al.

5,136,407 A *	8/1992	Clerc	349/146
5,229,873 A *	7/1993	Hirose et al.	349/146
5,307,189 A	4/1994	Nishiki et al.		
5,309,264 A *	5/1994	Lien et al.	349/143
5,327,001 A	7/1994	Wakai et al.		
5,627,665 A	5/1997	Yamada et al.		
5,668,649 A	9/1997	Suzuki et al.		
5,680,187 A	10/1997	Nagayama et al.		
5,696,568 A	12/1997	Yamamoto et al.		
5,854,663 A	12/1998	Oh et al.		
5,929,960 A	7/1999	West et al.		
6,081,315 A *	6/2000	Matsuyama et al.	349/143
6,108,061 A	8/2000	Sako et al.		

(Continued)

FOREIGN PATENT DOCUMENTS

JP 9-244031 A 9/1997

Primary Examiner—James A Dudek

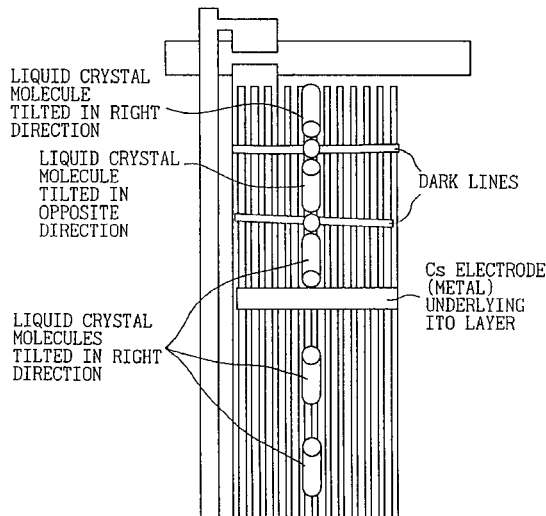
(74) *Attorney, Agent, or Firm*—Greer, Burns & Crain, Ltd.

(57)

ABSTRACT

A liquid crystal display device including a pair of substrates with a liquid crystal layer sandwiched between the pair of substrates. The liquid crystal layer includes a photopolymerizable component mixed therein, and there is a pixel electrode formed on one of the substrates. The pixel electrode includes at least two pixel slit areas separated by a liquid crystal domain boundary area, wherein each of the pixel slit areas includes a plurality of generally parallel slits therein. Further, an additional electrode, having the same potential as the pixel electrode, is formed in at least a portion of the liquid crystal domain boundary area without extending into any of the pixel slit areas.

9 Claims, 43 Drawing Sheets



US 7,450,206 B2

Page 2

U.S. PATENT DOCUMENTS

6,160,604 A *	12/2000	Murai et al.	349/143	6,657,686 B2	12/2003	Choi	
6,181,406 B1	1/2001	Morimoto et al.	349/155	6,657,695 B1	12/2003	Song et al.	
6,243,146 B1	6/2001	Rho et al.		6,771,344 B2	8/2004	Lyu et al.	
6,285,431 B2 *	9/2001	Lyu et al.	349/143	6,778,244 B2	8/2004	Song et al.	
6,287,733 B1	9/2001	Miyazaki et al.	430/7	6,894,735 B2 *	5/2005	Chae et al.	349/38
6,396,077 B1	5/2002	Kubota et al.		6,919,945 B2	7/2005	Ha	
6,445,437 B1	9/2002	Miyazaki et al.	349/156	6,937,311 B2 *	8/2005	Song et al.	349/129

* cited by examiner

Fig.1

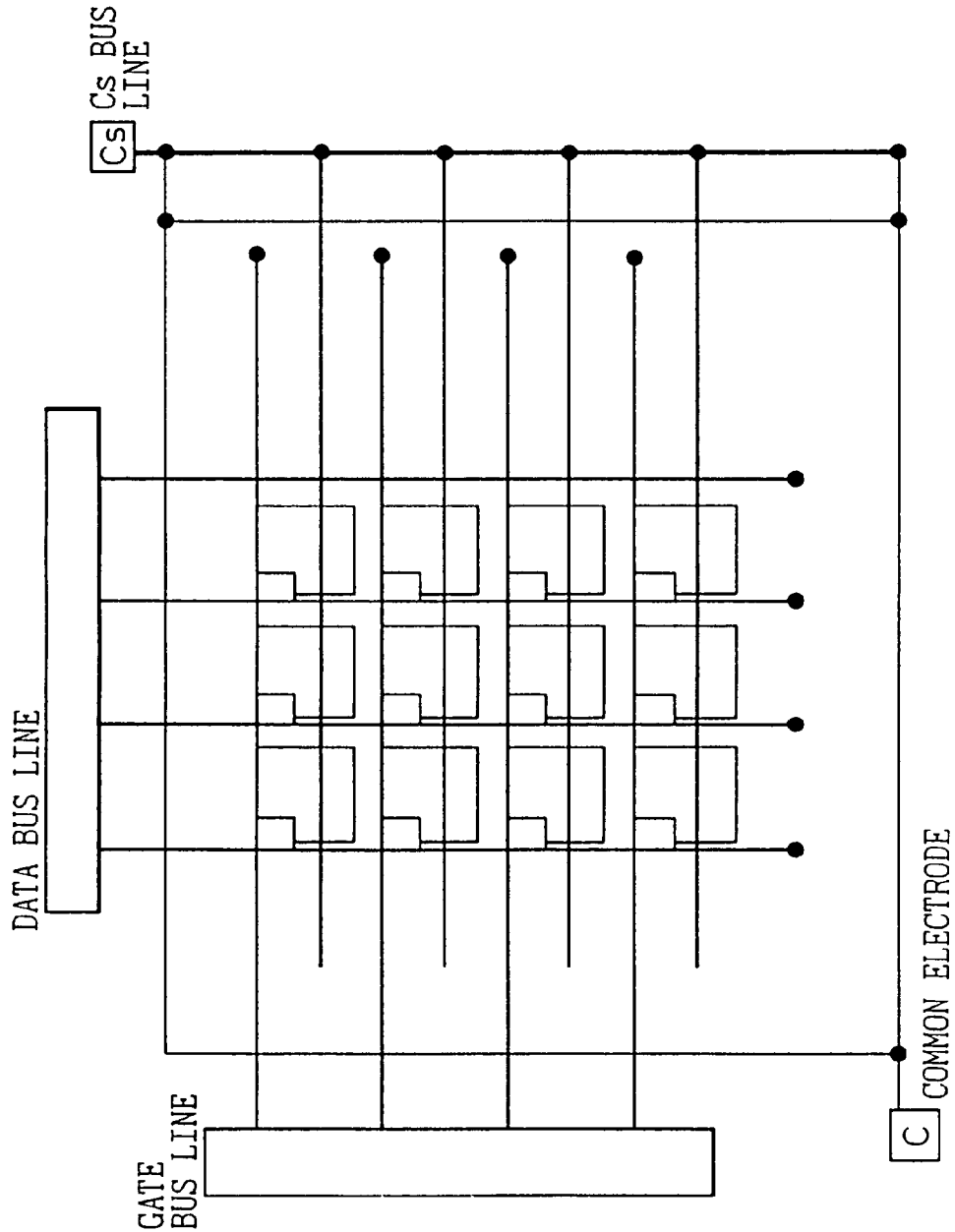
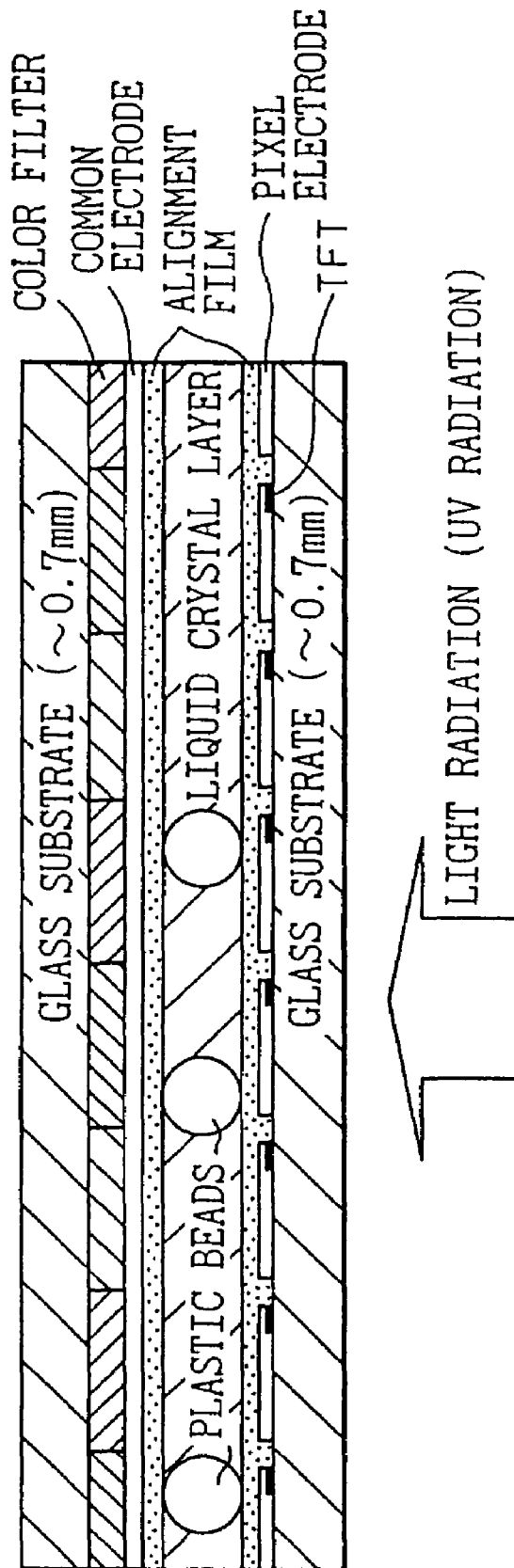


Fig. 2



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.