



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

(10) **Patent No.:** **US 7,148,944 B2**  
(45) **Date of Patent:** **Dec. 12, 2006**

(54) **BENDABLE DISPLAY APPARATUS AND METHOD OF MANUFACTURING THE SAME**

(75) Inventors: **Masaki Kinoshita**, Saku (JP); **Kenji Kawamata**, Kumagaya (JP); **Satoru Yamanaka**, Fukaya (JP); **Hiroyuki Kurisu**, Ageo (JP); **Tatsuya Miyazaki**, Fukaya (JP); **Yasushi Kawata**, Ageo (JP)

(73) Assignee: **Toshiba Matsushita Display Technology Co., Ltd.**, Tokyo (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.: **10/807,186**

(22) Filed: **Mar. 24, 2004**

(65) **Prior Publication Data**  
US 2004/0179165 A1 Sep. 16, 2004

**Related U.S. Application Data**  
(63) Continuation of application No. PCT/JP03/06071, filed on May 15, 2003.

(30) **Foreign Application Priority Data**  
May 17, 2002 (JP) ..... 2002-143812  
May 17, 2002 (JP) ..... 2002-143813  
May 17, 2002 (JP) ..... 2002-143814  
May 13, 2003 (JP) ..... 2003-134349

(51) **Int. Cl.**  
**G02F 1/1333** (2006.01)

(52) **U.S. Cl.** ..... **349/158**

(58) **Field of Classification Search** ..... **349/158,**  
**349/96**

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,396,351 A *	3/1995	Gessel .....	349/159
6,262,787 B1 *	7/2001	Kamoi et al. ....	349/96
6,335,771 B1 *	1/2002	Hiraishi .....	349/42
6,356,330 B1 *	3/2002	Ando et al. ....	349/141
6,473,140 B1 *	10/2002	Mizobata et al. ....	349/12
6,512,504 B1 *	1/2003	Yamauchi et al. ....	345/87
6,812,974 B1 *	11/2004	Hinata et al. ....	349/12

**FOREIGN PATENT DOCUMENTS**

EP	0 342 925 A2	11/1989
JP	51-83496	7/1976
JP	53-93858	8/1978
JP	58-114085	7/1983
JP	60-188929	9/1985
JP	60-247618	12/1985
JP	2-264217	10/1990
JP	4-235527	8/1992
JP	5-61011	3/1993
JP	6-67135	3/1994
JP	6-194615	7/1994
JP	6-230356	8/1994
JP	8-50282	2/1996
JP	9-160052	6/1997
JP	2678325	8/1997

(Continued)

*Primary Examiner*—Andrew Schechter

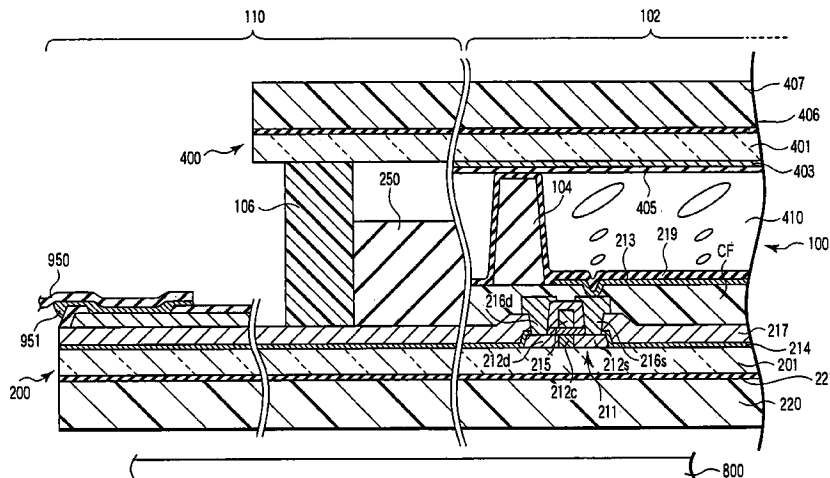
*Assistant Examiner*—Richard Kim

(74) *Attorney, Agent, or Firm*—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

(57) **ABSTRACT**

A display apparatus with a plurality of display pixel sections includes glass substrate, which are formed to have a thickness that permits bending of the display apparatus, and polarizer plates, which are disposed on the glass substrates, respectively. The polarizer plates are thicker than the glass substrates.

**12 Claims, 14 Drawing Sheets**



# US 7,148,944 B2

Page 2

---

FOREIGN PATENT DOCUMENTS			JP	2001-202028	7/2001
JP	10-48663	2/1998	KR	1998-020094	6/1998
JP	11-38395	2/1999	KR	2002-0001638	1/2002
JP	11-174463	7/1999			
JP	3059866	4/2000			

\* cited by examiner

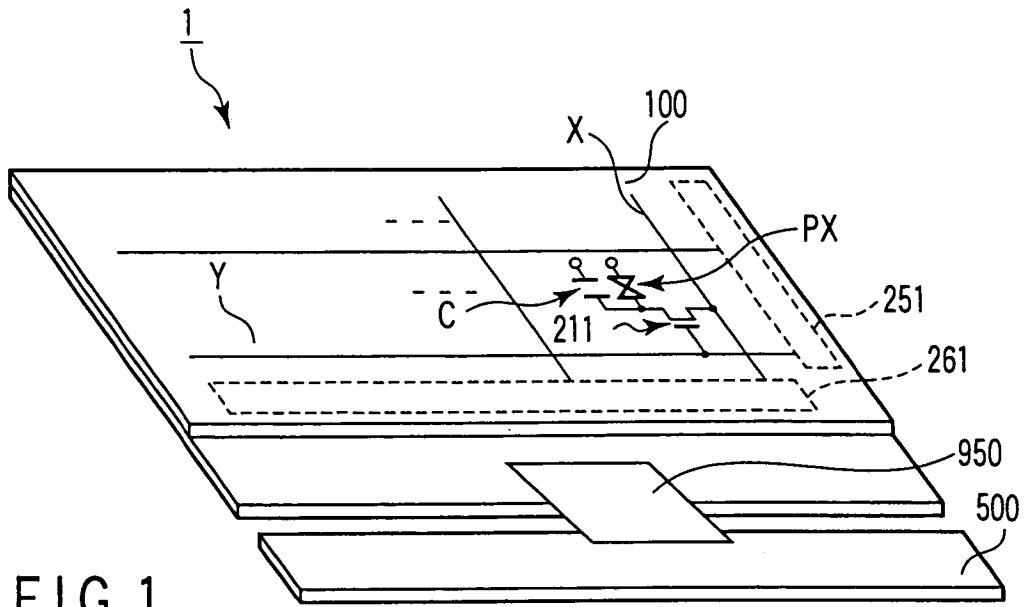


FIG. 1

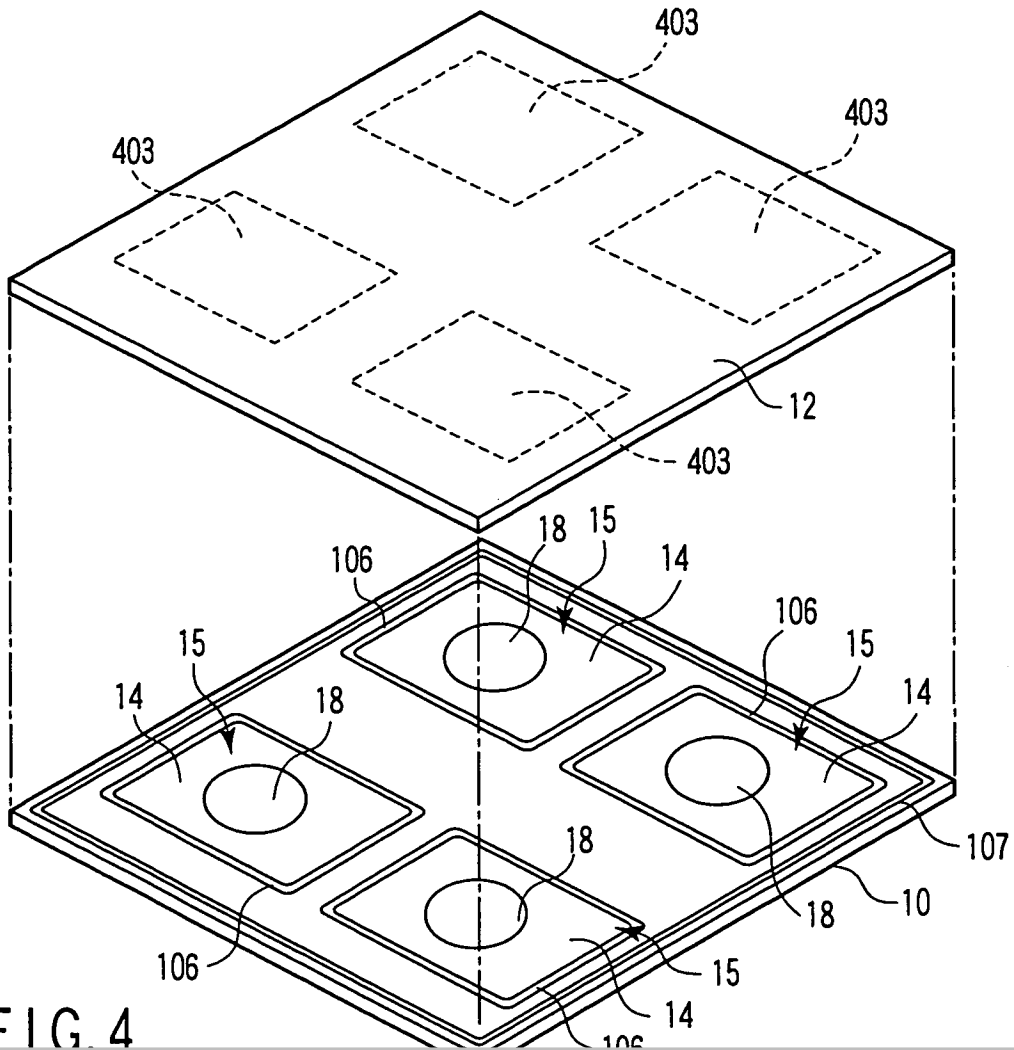


FIG. 4

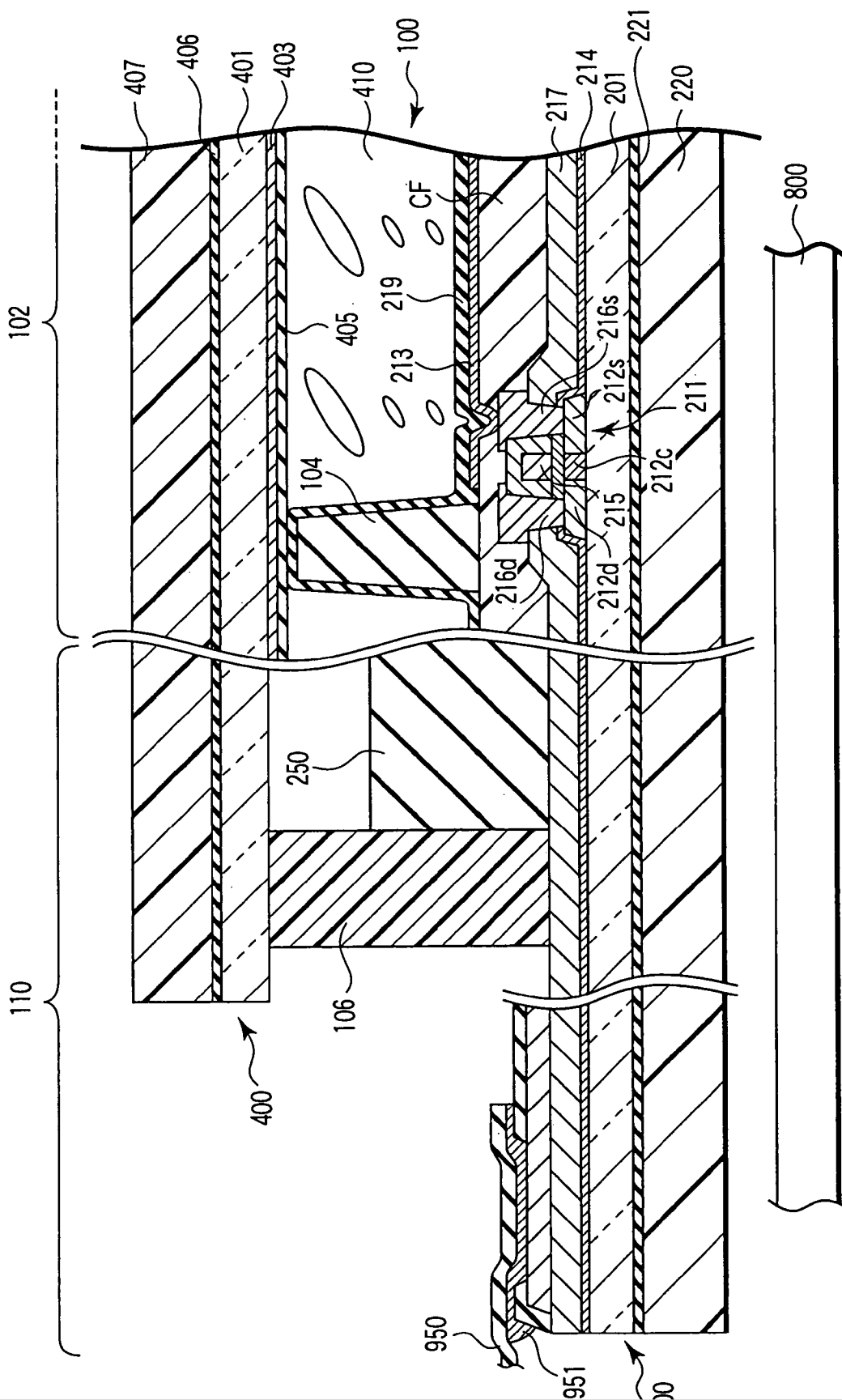


FIG. 2

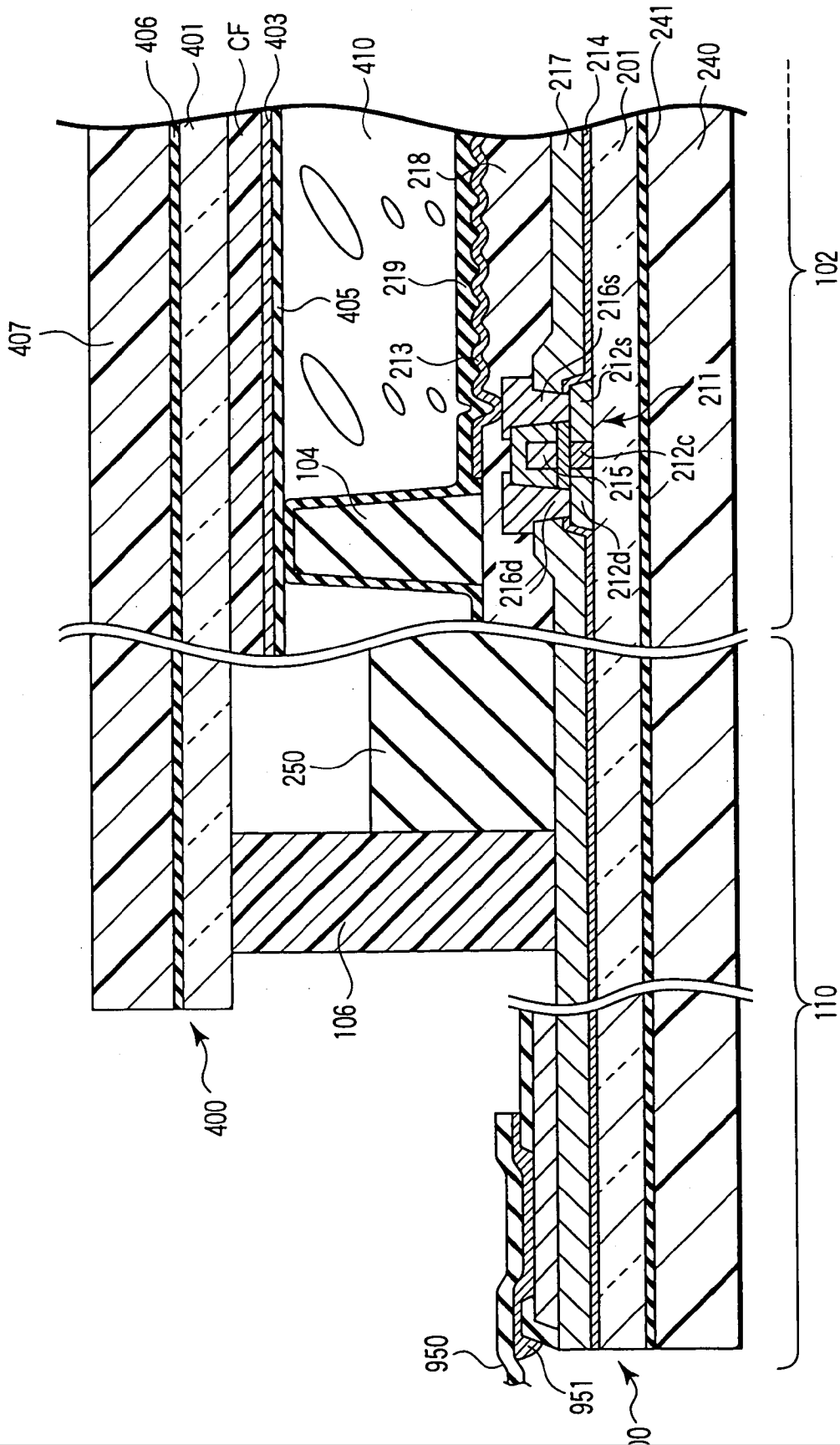


FIG. 3

# 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.