



US009030724B2

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

(10) **Patent No.:** **US 9,030,724 B2**
(45) **Date of Patent:** **May 12, 2015**

(54) **FLEXIBLE AND PRINTABLE ELECTROOPTIC DEVICES**

(75) Inventors: **Anoop Agrawal**, Tucson, AZ (US); **John P. Cronin**, Tucson, AZ (US); **Lori L. Adams**, Tucson, AZ (US); **Juan Carlos L. Tonazzi**, Tucson, AZ (US)

(73) Assignee: **Chromera, Inc.**, Poway, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 694 days.

(21) Appl. No.: **13/002,275**

(22) PCT Filed: **Jul. 2, 2009**

(86) PCT No.: **PCT/US2009/049644**

§ 371 (c)(1),
(2), (4) Date: **Dec. 30, 2010**

(87) PCT Pub. No.: **WO2010/003138**

PCT Pub. Date: **Jan. 7, 2010**

(65) **Prior Publication Data**

US 2011/0096388 A1 Apr. 28, 2011

Related U.S. Application Data

(60) Provisional application No. 61/078,328, filed on Jul. 3, 2008, provisional application No. 61/087,796, filed on Aug. 11, 2008, provisional application No. 61/109,691, filed on Oct. 30, 2008, provisional application No. 61/156,932, filed on Mar. 3, 2009, provisional application No. 61/168,421, filed on Apr. 10, 2009, provisional application No. 61/187,619, filed on Jun. 16, 2009.

(51) **Int. Cl.**
G02F 1/153 (2006.01)
G02F 1/15 (2006.01)
G02F 1/163 (2006.01)

(52) **U.S. Cl.**
CPC **G02F 1/1506** (2013.01); **G02F 1/1508** (2013.01); **G02F 1/1533** (2013.01); **G02F 1/163** (2013.01); **G02F 2001/1515** (2013.01); **Y10T 29/49155** (2013.01)

(58) **Field of Classification Search**
USPC 359/265–275
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,253,100	A *	10/1993	Yang et al.	359/266
2002/0005977	A1 *	1/2002	Guarr et al.	359/265
2003/0227664	A1 *	12/2003	Agrawal et al.	359/269
2007/0139756	A1 *	6/2007	Agrawal et al.	359/265

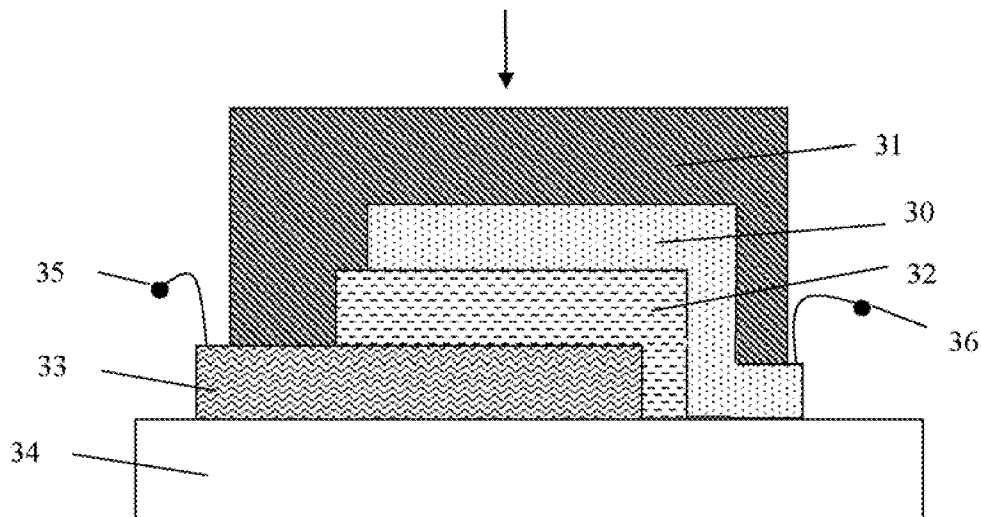
* cited by examiner

Primary Examiner — Evelyn A. Lester

(57) **ABSTRACT**

This invention discloses how electrooptic devices including electrochromic devices that can be fabricated as tags or labels; and further the materials used, device structures and how these can be processed by printing technologies and on flexible substrates. In addition, systems using displays of such devices and their integration with other components are described for forming labels and tags, etc. that may be actuated wirelessly or powered with low voltage and low capacity batteries.

25 Claims, 26 Drawing Sheets



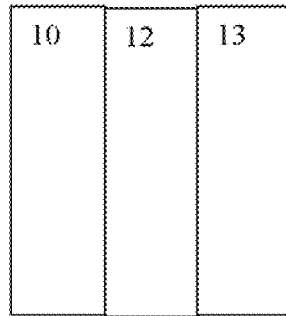


Figure 1

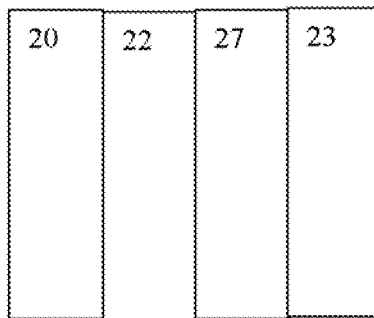


Figure 2

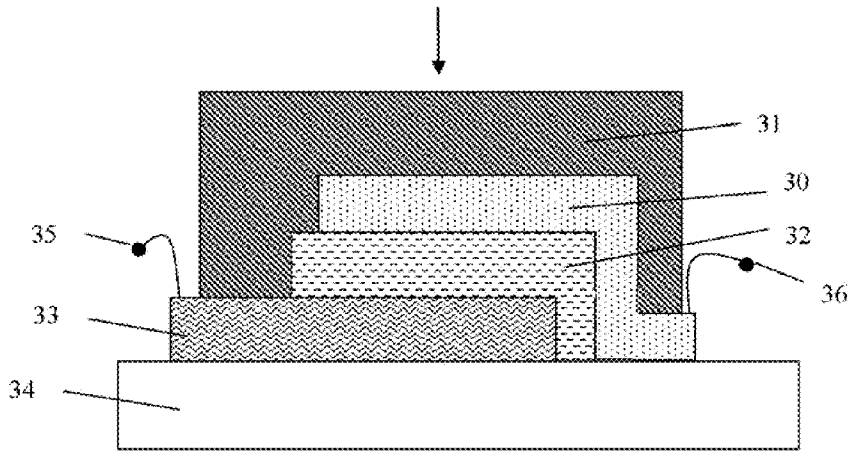


Figure 3a

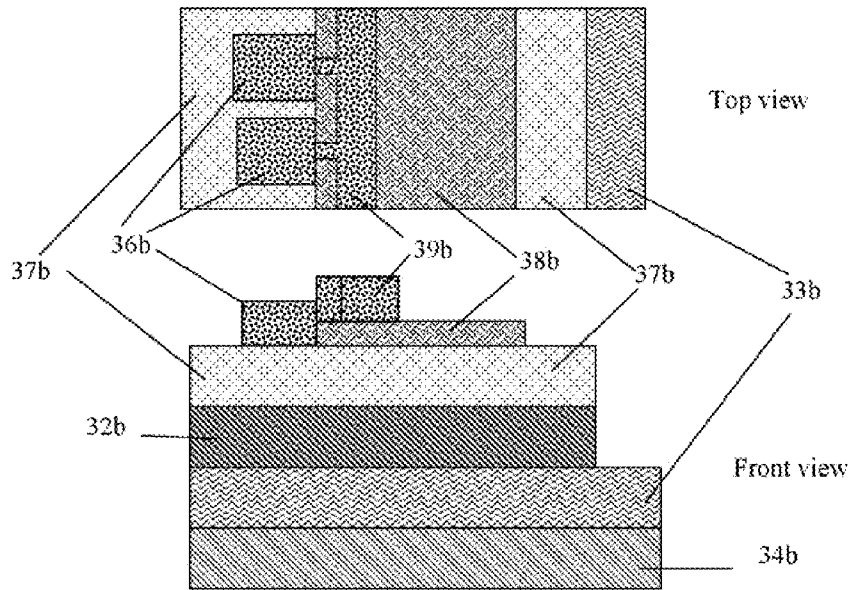


Figure 3b

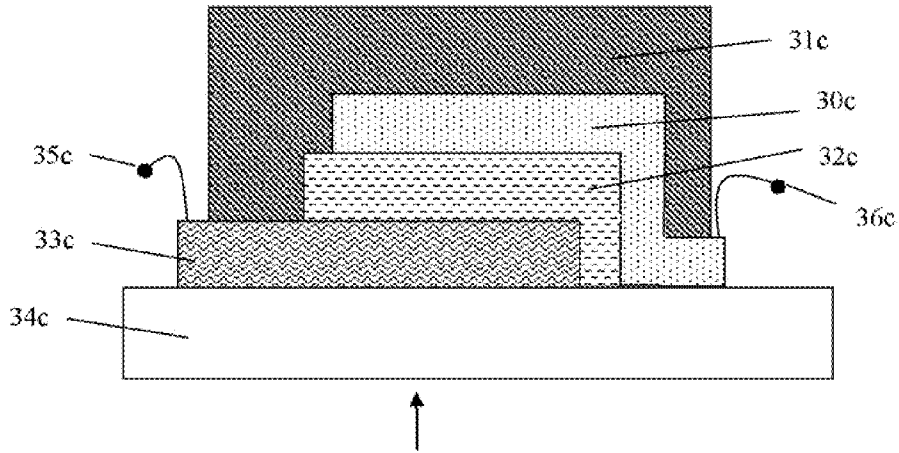


Figure 3c

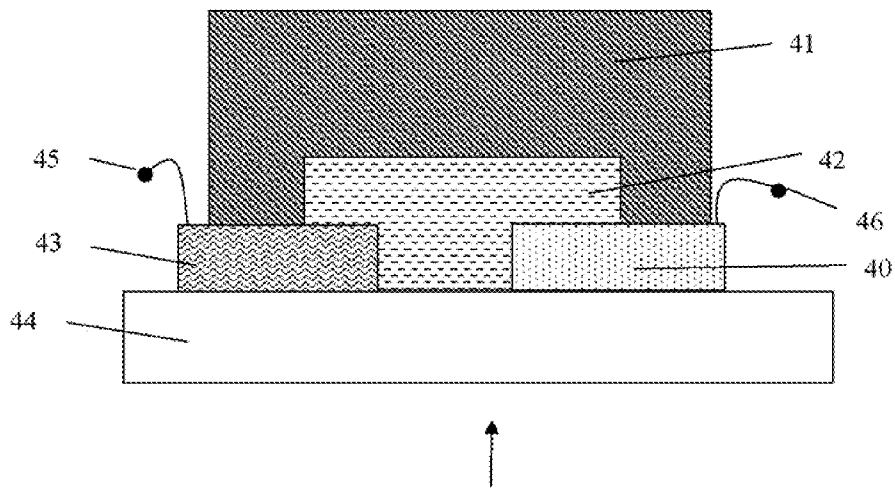


Figure 4

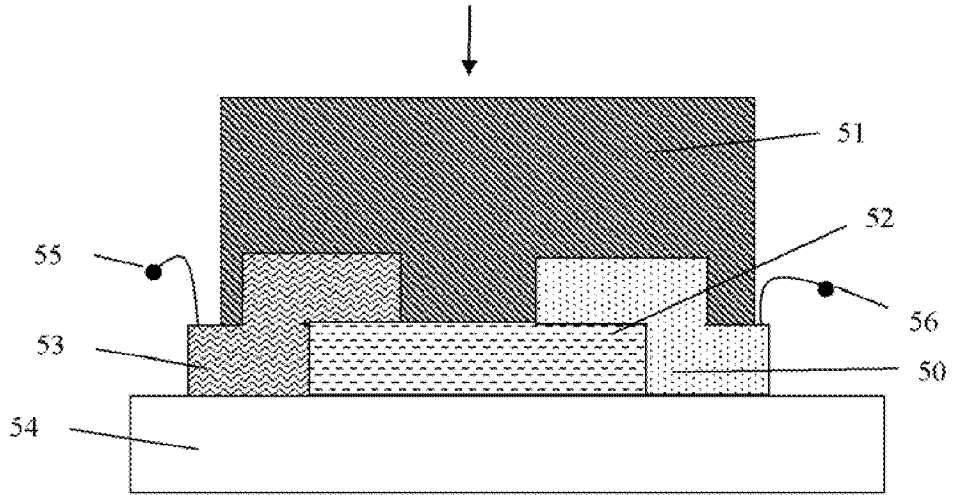


Figure 5

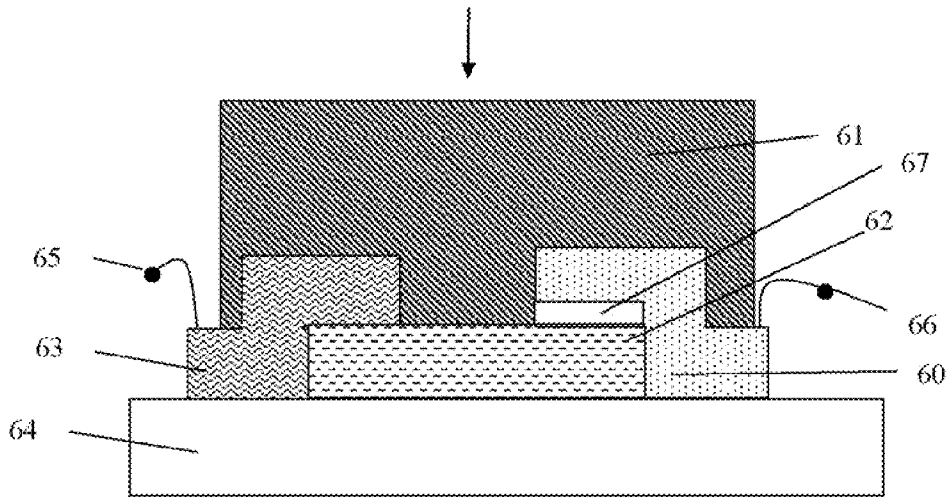


Figure 6 a

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.