

[54] LIQUID CRYSTAL DISPLAY APPARATUS HAVING TERMINAL PROTECTED FROM BREAK DOWN

[75] Inventors: Osamu Sukegawa; Takahiko Watanabe; Wakahiko Kaneko, all of Tokyo, Japan

[73] Assignee: NEC Corporation, Tokyo, Japan

[21] Appl. No.: 493,537

[22] Filed: Jun. 22, 1995

[30] Foreign Application Priority Data

Jun. 23, 1994 [JP] Japan 6-163337

[51] Int. Cl.⁶ G02F 1/1343

[52] U.S. Cl. 349/149

[58] Field of Search 359/88, 85, 83

[56] References Cited

U.S. PATENT DOCUMENTS

5,187,604 2/1993 Taniguchi et al. 359/88
 5,311,341 5/1994 Hirai 359/88

FOREIGN PATENT DOCUMENTS

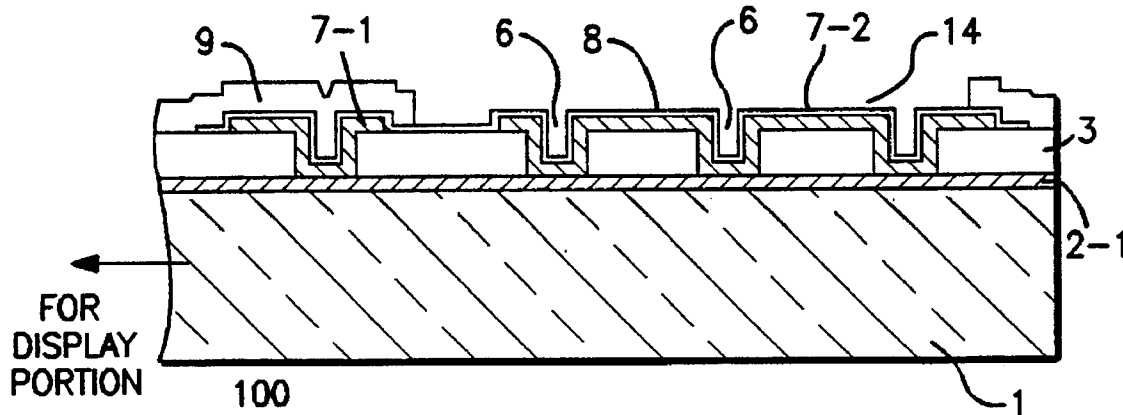
64-19324 1/1989 Japan 359/88
 4-32821 2/1992 Japan .

Primary Examiner—William L. Sikes
 Assistant Examiner—James A. Dudek
 Attorney, Agent, or Firm—Young & Thompson

[57] ABSTRACT

A lower layer metal wiring is led out from a display portion to a terminal portion provided to the periphery of the glass substrate and covered at the upper surface with an interlayer insulation film. An upper layer metal wiring formed on the interlayer insulation film is connected to the lower layer metal wiring by way of contact holes formed in the interlayer insulation film. The upper layer metal wiring is completely covered by the transparent conductive film. A protective insulation film is formed on the transparent conductive film, and an opening is made in to the protective insulation film in the terminal portion. In the terminal portion, copper foil wirings of a flexible wiring substrate are connected by way of an anisotropic conductive film. The upper layer metal wiring is removed at a portion not protected by the protective insulation film or the anisotropic conductive film.

14 Claims, 6 Drawing Sheets



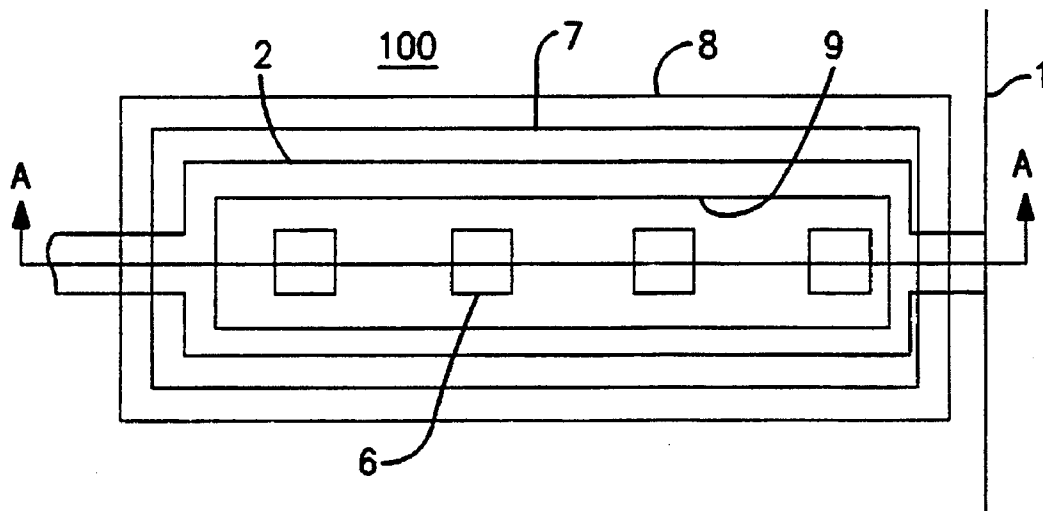


FIG. 1A
PRIOR ART

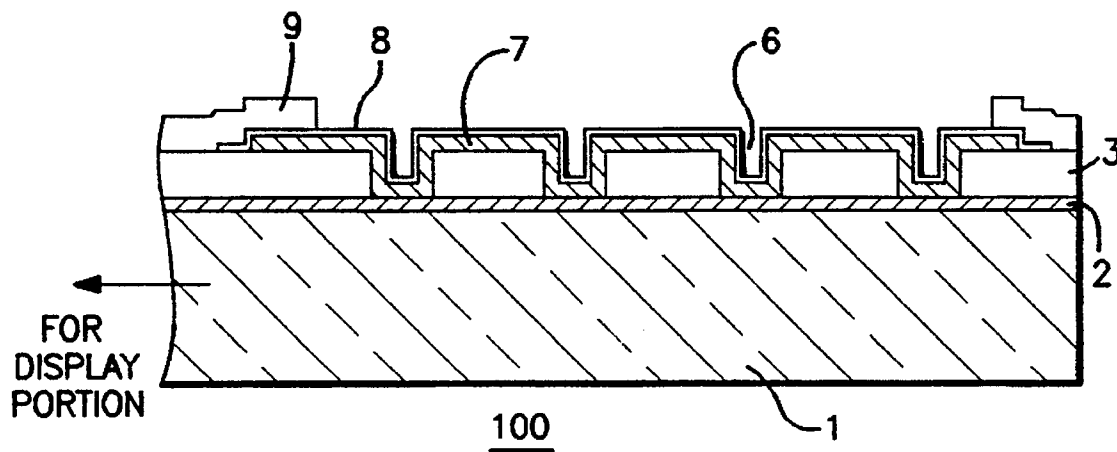


FIG. 1B
PRIOR ART

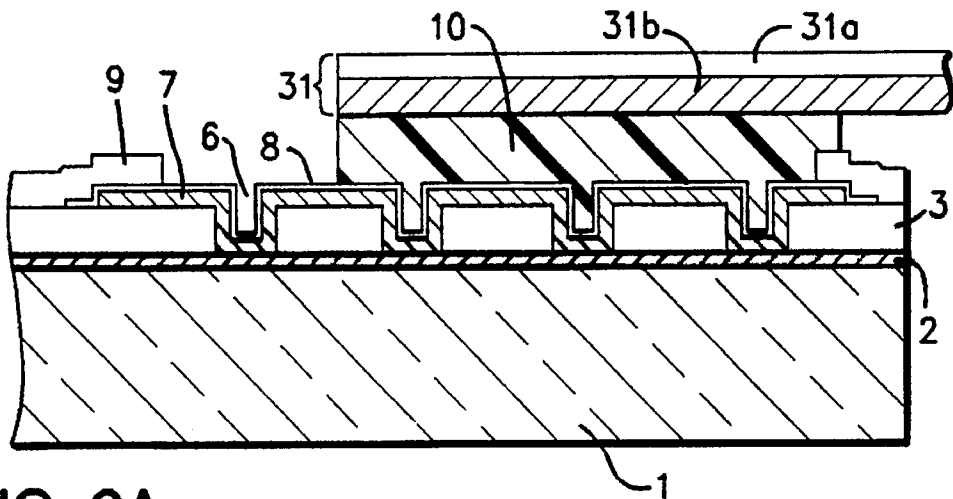


FIG. 2A
PRIOR ART

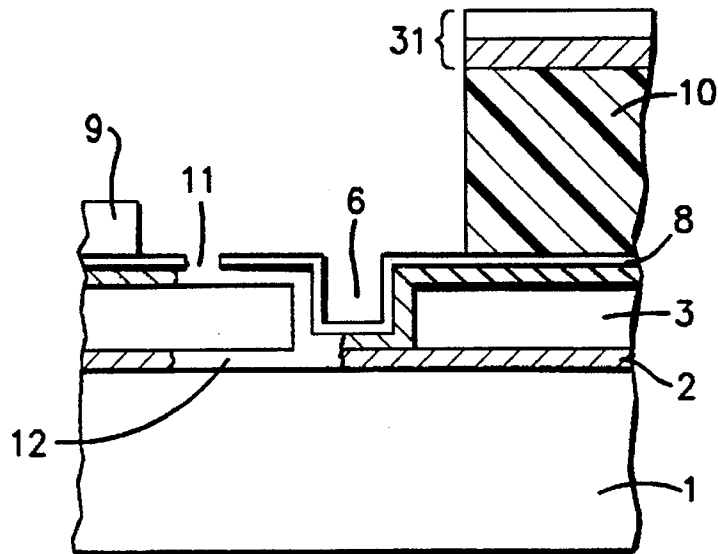


FIG. 2B
PRIOR ART

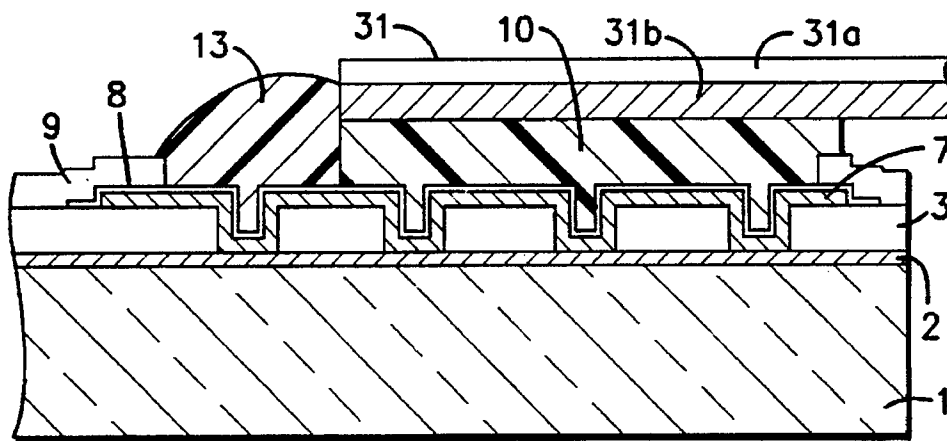


FIG. 2C
PRIOR ART

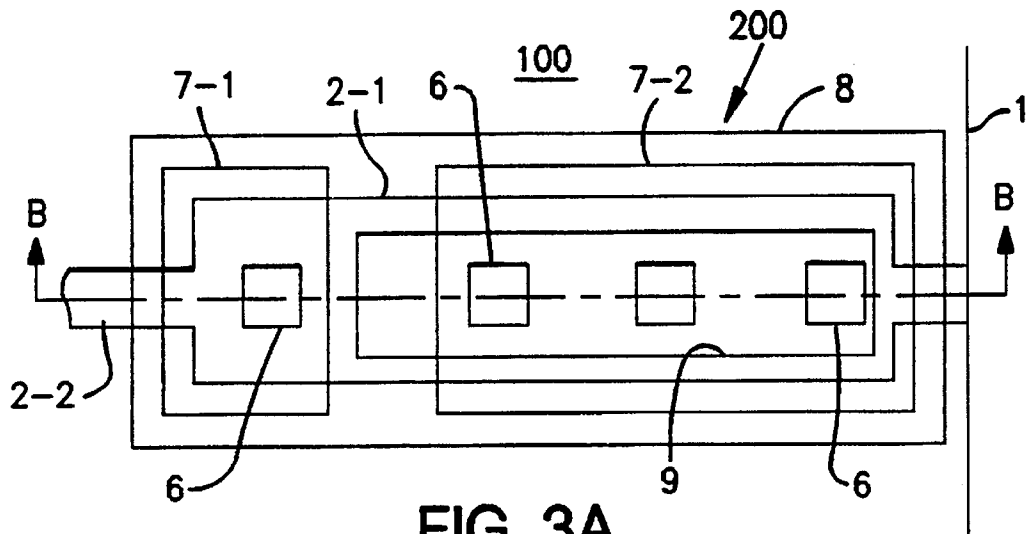


FIG. 3A

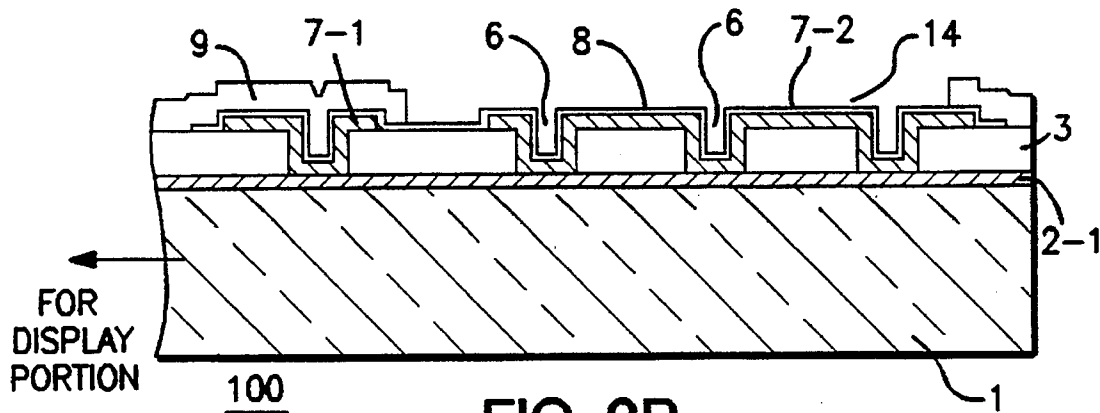


FIG. 3B

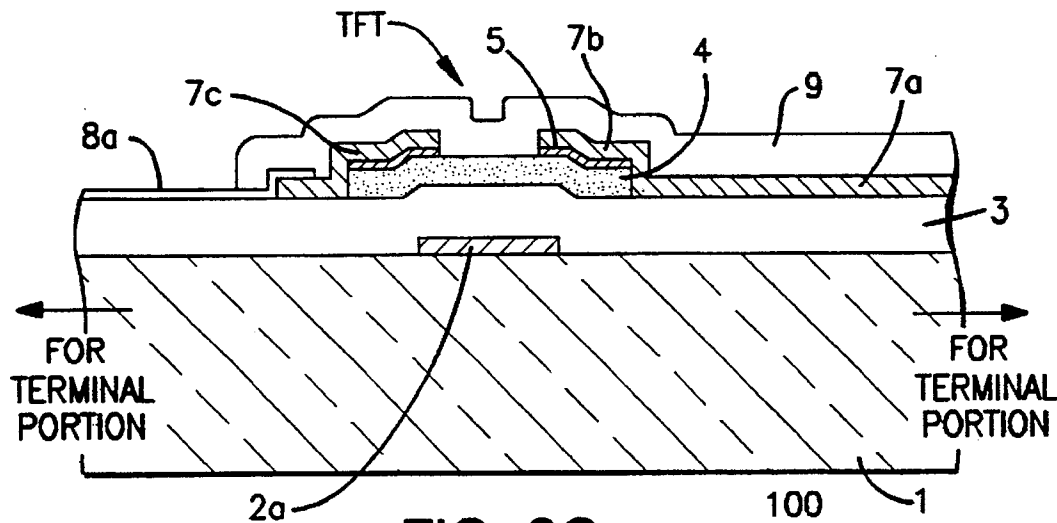


FIG. 3C

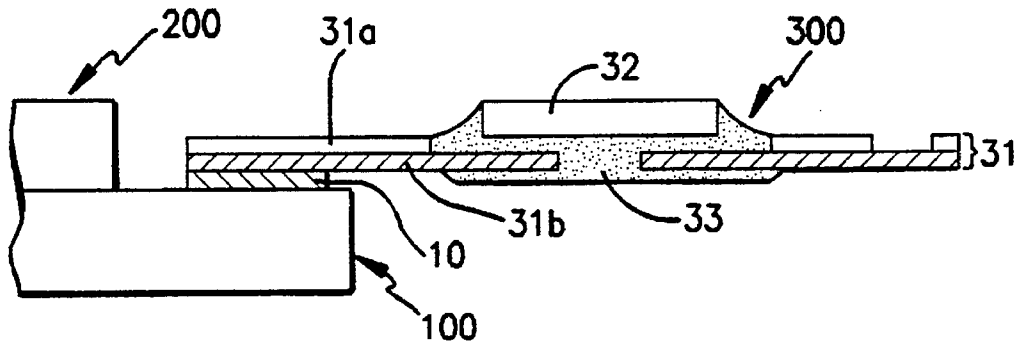


FIG. 3D

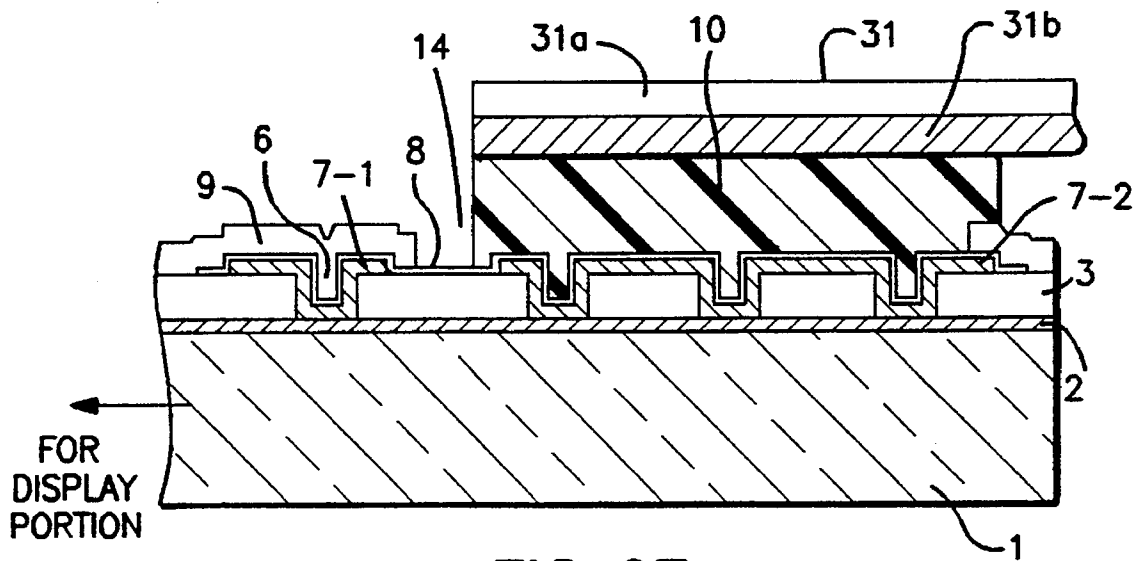


FIG. 3E

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.