

United States Patent [19]

Shiba et al.

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[45] **Date of Patent:** Nov. 4, 1997

[54] **LIQUID CRYSTAL DISPLAY PANEL**

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[73] Assignee: **Kabushiki Kaisha Toshiba,** Kawasaki,
Japan

[21] Appl. No.: **574,193**

[22] Filed: **Dec. 18, 1995**

[30] **Foreign Application Priority Data**

Dec. 19, 1994 [JP] Japan 6-314825

[51] **Int. Cl.⁶** **G02F 1/136; G02F 1/1345;**
G02F 1/1339

[52] **U.S. Cl.** **349/149; 349/42; 349/153;**
349/154

[58] **Field of Search** **359/88, 80, 59;**
349/42, 153, 154, 149

[56] **References Cited**

U.S. PATENT DOCUMENTS

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Primary Examiner—William L. Sikes

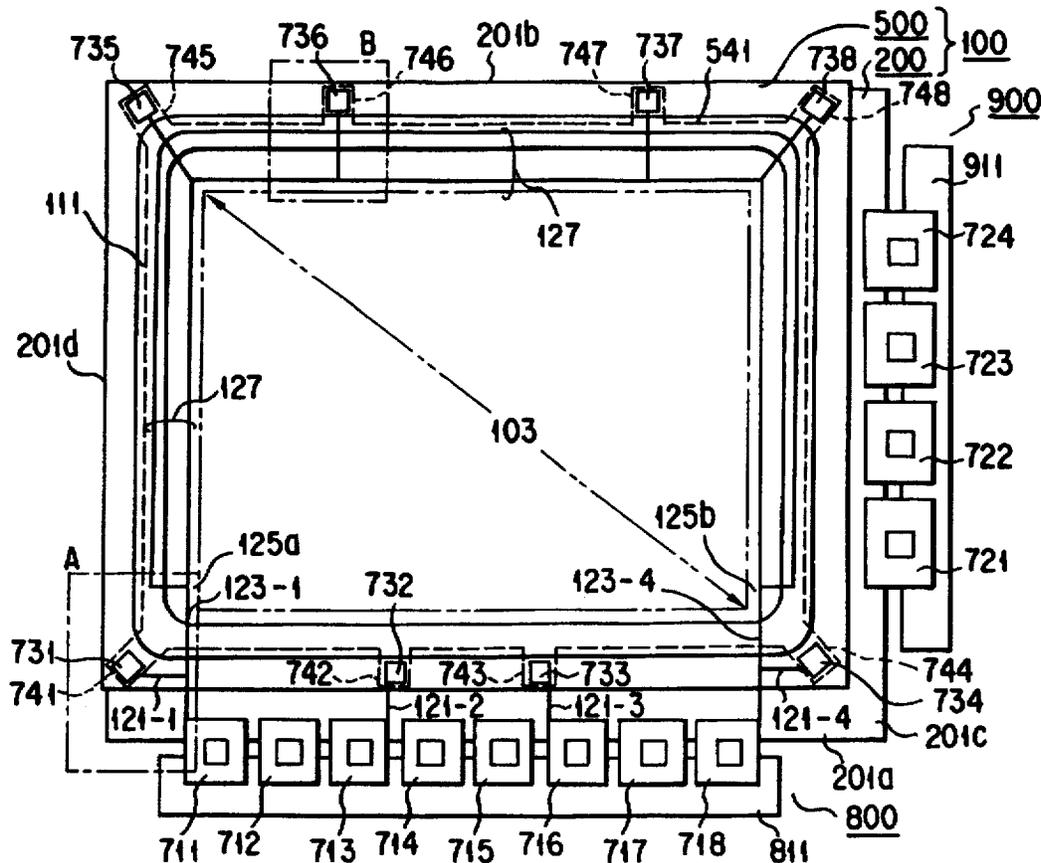
Assistant Examiner—Julie Ngo

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Group of Pillsbury Madison & Sutro LLP

[57] **ABSTRACT**

The present invention is to provide an LCD panel in which the effective display area is great relative to the outside dimension. The LCD panel comprises an array substrate, a counter substrate and a light modulating layer obtained by injecting liquid crystal into the gap between these substrates. The array substrate includes a display area and a seal region formed around the display area. The display area includes data lines, scanning lines, switching devices controlled by the scanning lines and pixel electrodes connected to the data lines. The seal region includes a first wiring line constituted by a plurality of narrow lines and arranged along the seal line. The counter substrate has a counter electrode and is arranged opposite to the array substrate with a gap therebetween. The counter substrate is adhered to the array substrate in the seal region. A voltage is supplied to the counter electrode through the first wiring line.

30 Claims, 4 Drawing Sheets



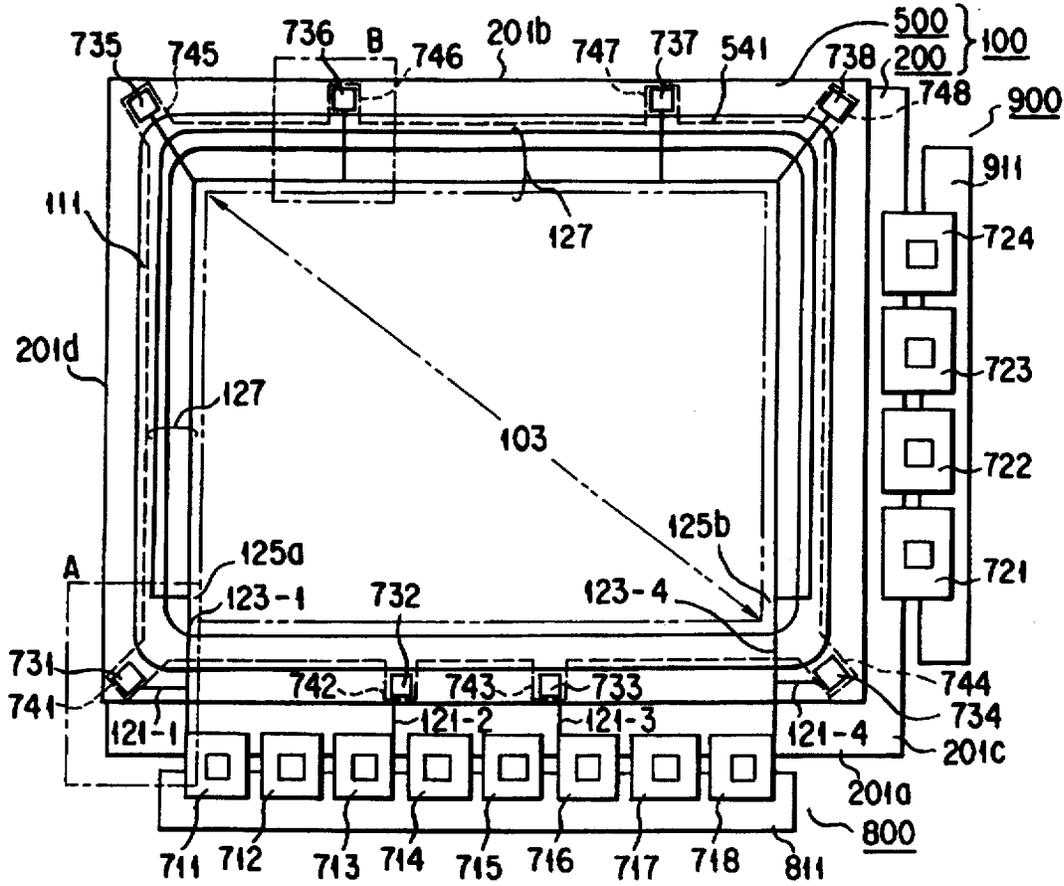


FIG. 1

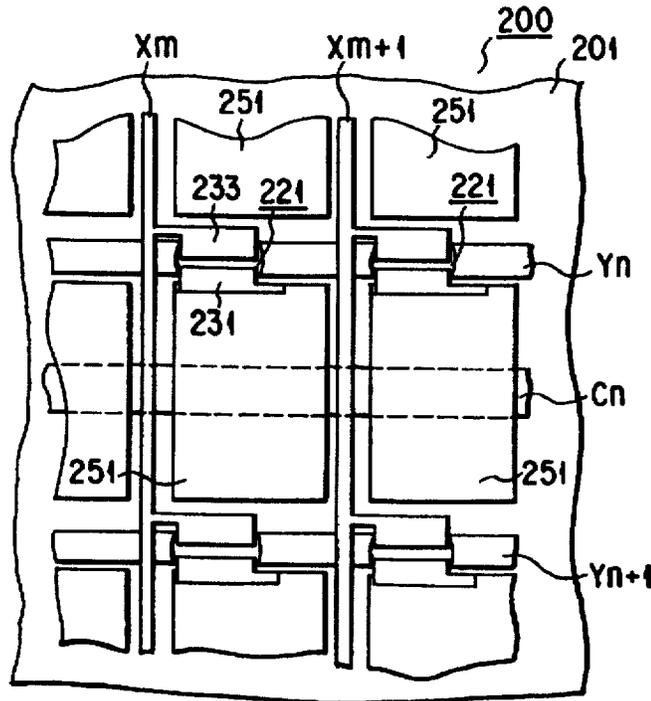


FIG. 2

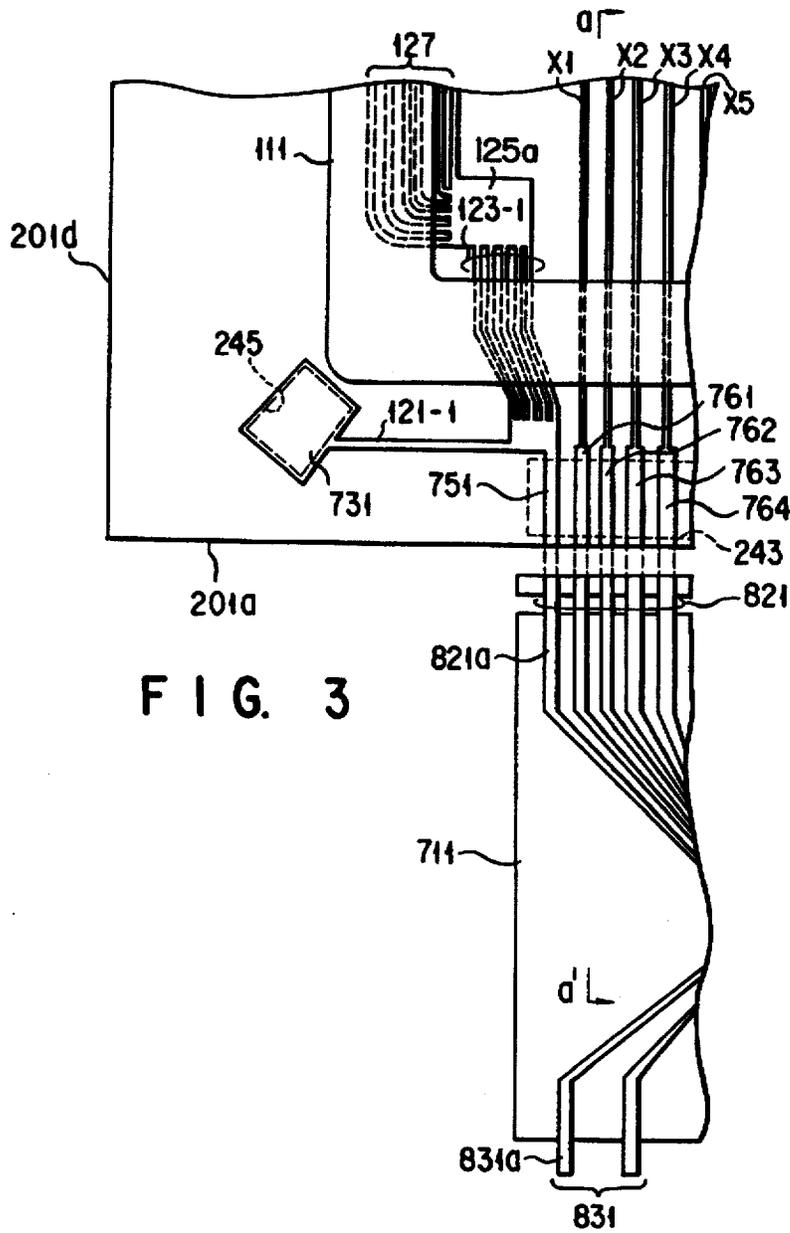


FIG. 3

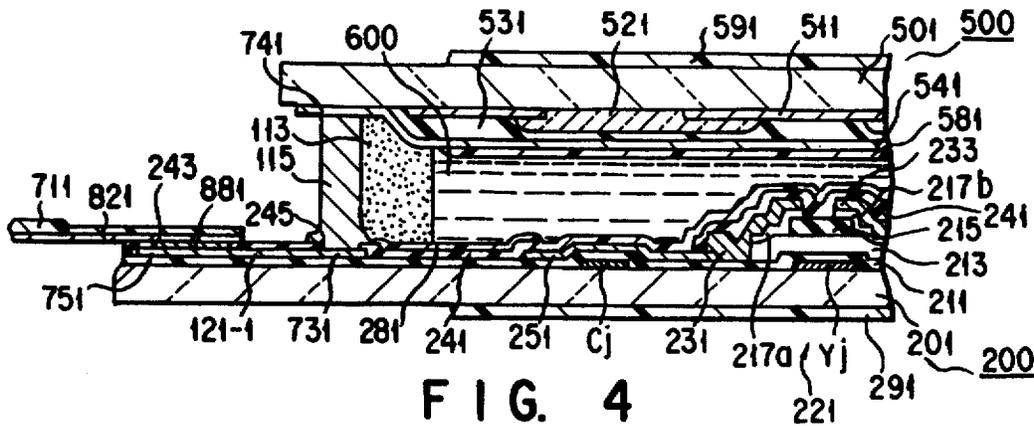


FIG. 4

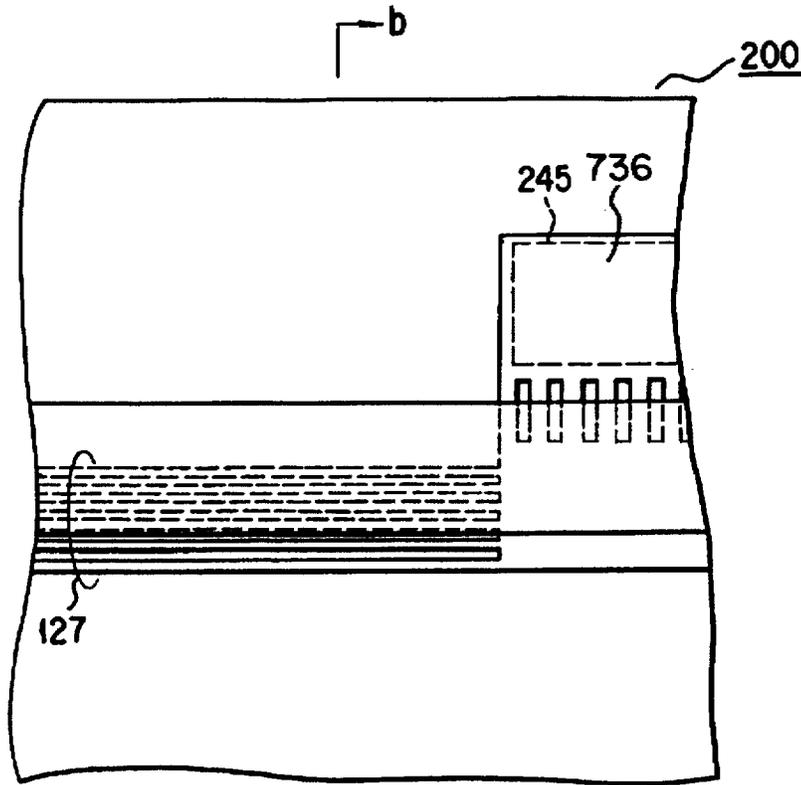


FIG. 5

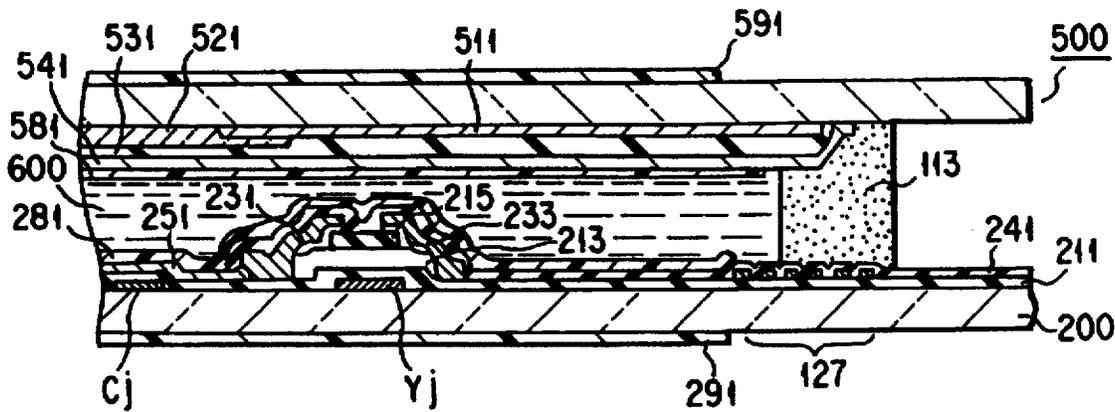


FIG. 6

FIG. 7A

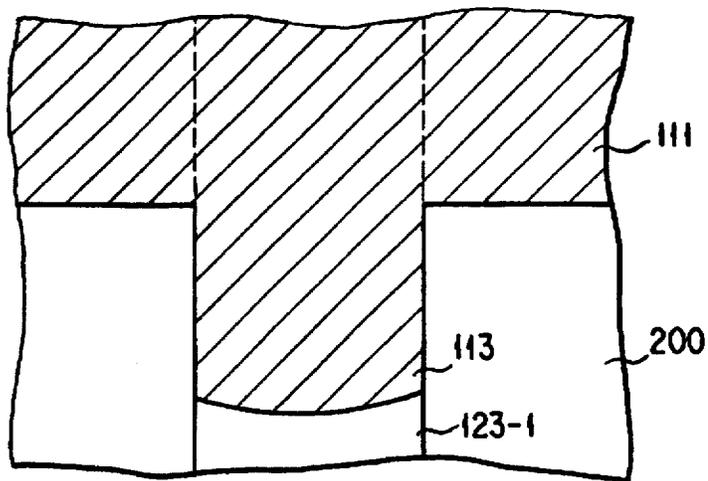


FIG. 7B

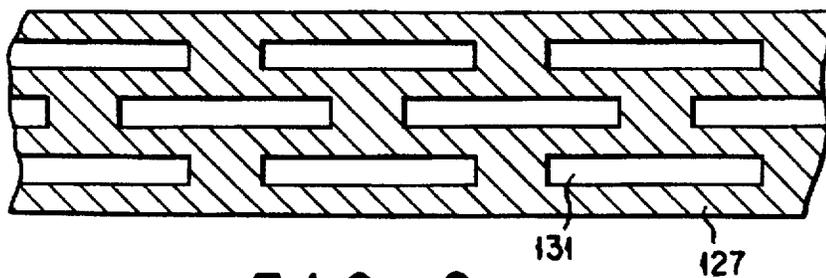
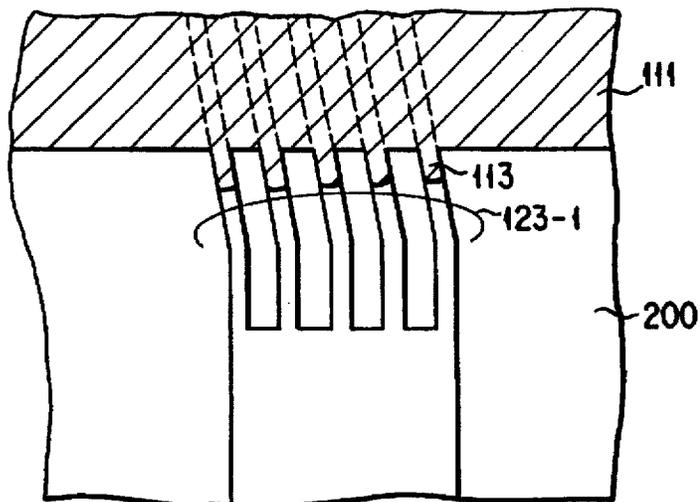


FIG. 8

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