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**Ikeda et al.**

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(54) **THIN FILM TRANSISTOR AND IMAGE DISPLAY UNIT**

(75) Inventors: **Noriaki Ikeda**, Tokyo (JP); **Kodai Murata**, Tokyo (JP); **Manabu Ito**, Tokyo (JP); **Chihiro Miyazaki**, Tokyo (JP)

(73) Assignee: **Toppaan Printing Co., Ltd.** (JP)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 521 days.

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(51) **Int. Cl.**

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**H01L 31/036** (2006.01)  
**H01L 27/01** (2006.01)  
**H01L 27/12** (2006.01)  
**H01L 31/0376** (2006.01)

(52) **U.S. Cl.**

USPC ..... **257/59; 257/57; 257/72; 257/347; 257/350**

(58) **Field of Classification Search**

USPC ..... 257/59, 57, 72, 71, 40, 296, 535, 257/368, 306, 347, 350, 202, 351, 443  
See application file for complete search history.

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*Primary Examiner* — Chuong A. Luu

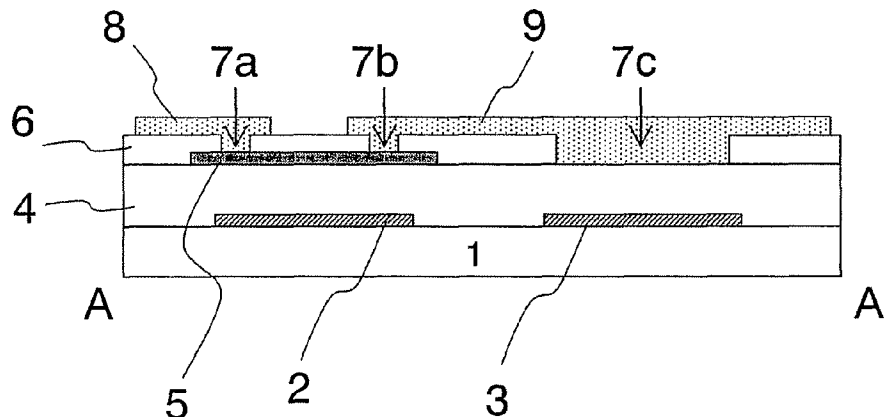
(74) *Attorney, Agent, or Firm* — Squire Sanders (US) LLP

(57) **ABSTRACT**

One embodiment of the present invention is a thin film transistor having a substrate, a gate electrode formed on the substrate, a gate insulating film, a semiconductor layer formed on the gate insulating film, a protective film formed on the semiconductor layer and the gate insulating film and having first and second opening sections which are separately and directly formed on the semiconductor layer, a source electrode formed on the protective film and electrically connected to the semiconductor layer at the first opening section of the protective film, and a drain electrode formed on the protective film and electrically connected to the semiconductor layer at the second opening section of the protective film.

**13 Claims, 8 Drawing Sheets**

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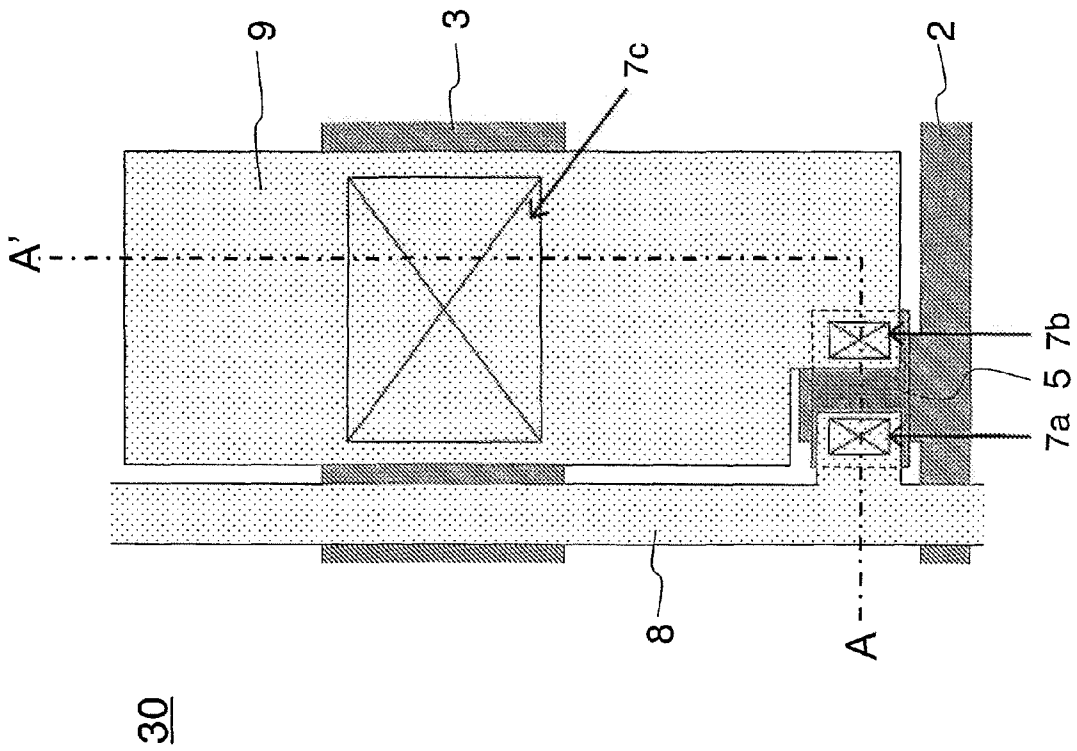


Fig. 1

Fig. 2

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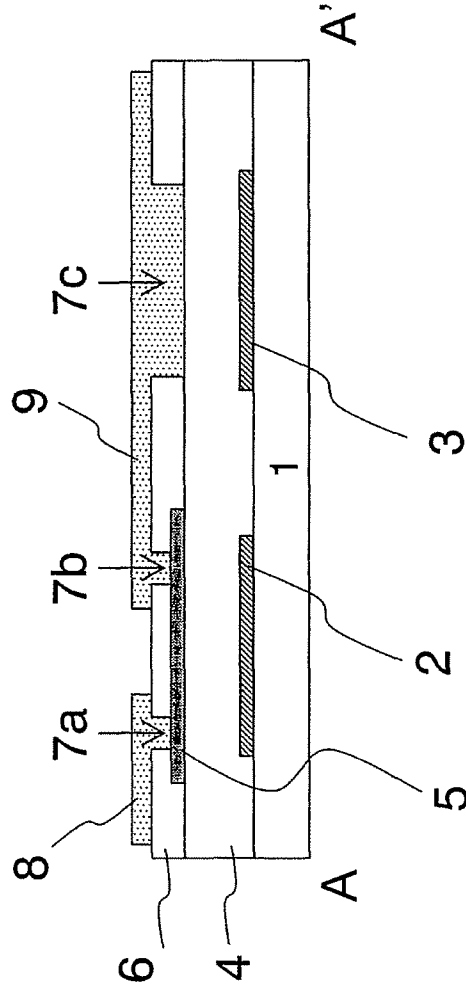


Fig. 3

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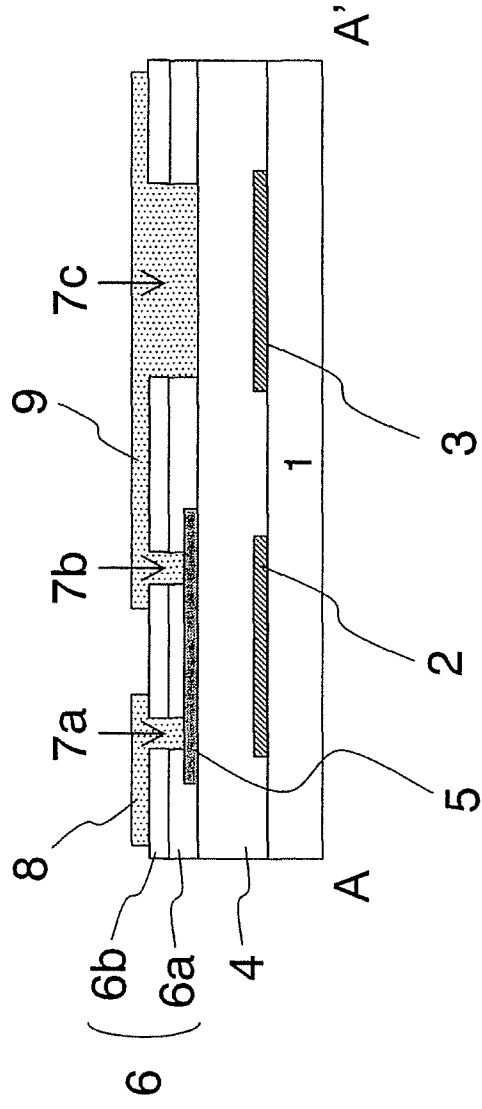
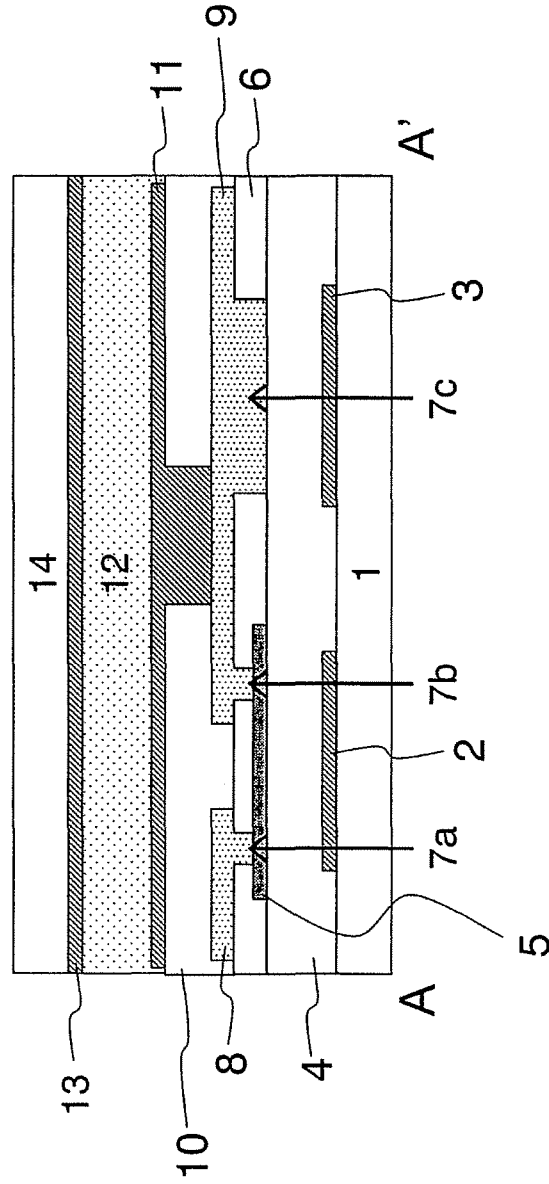


Fig. 4

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