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**Hirano**

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(54) **ELECTRO-OPTIC DEVICE WITH FOLDED INTERFACE SUBSTRATE HAVING FOLDED PROJECTIONS WITH ELECTRONIC PARTS**

2003/0067577 A1\* 4/2003 Yamada ..... 349/150  
2003/0117543 A1\* 6/2003 Chang ..... 349/58

(75) Inventor: **Yoshihisa Hirano**, Matsumoto (JP)

**FOREIGN PATENT DOCUMENTS**

(73) Assignee: **Seiko Epson Corporation** (JP)

JP 2000-276068 10/2000

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 155 days.

\* cited by examiner

(21) Appl. No.: **10/875,084**

*Primary Examiner*—Andrew Schechter

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*Assistant Examiner*—Phu Vu

(65) **Prior Publication Data**

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(74) *Attorney, Agent, or Firm*—Harness, Dickey & Pierce, P.L.C.

(30) **Foreign Application Priority Data**

Jun. 24, 2003 (JP) ..... 2003-179591

(57) **ABSTRACT**

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

An electrooptic device is provided that comprises an electrooptic panel having an image display region for displaying an image and an interface substrate connected to the electrooptic panel via a connection part. The interface substrate has a folding part folded at the connection part toward a lower-surface side of the electrooptic panel and projections extending from the folding part positioned at the lower-surface side of the electrooptic panel. The projections are folded toward a top-surface side of the electrooptic panel so that electronic parts of the projections are opposed to driver ICs that are mounted on an overhanging part of the electrooptic panel.

(52) **U.S. Cl.** ..... 349/150; 439/239; 349/58

(58) **Field of Classification Search** ..... 349/150, 349/110, 58; 345/102; 248/916

See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

6,806,920 B1\* 10/2004 Hayashi et al. .... 349/58

**16 Claims, 15 Drawing Sheets**

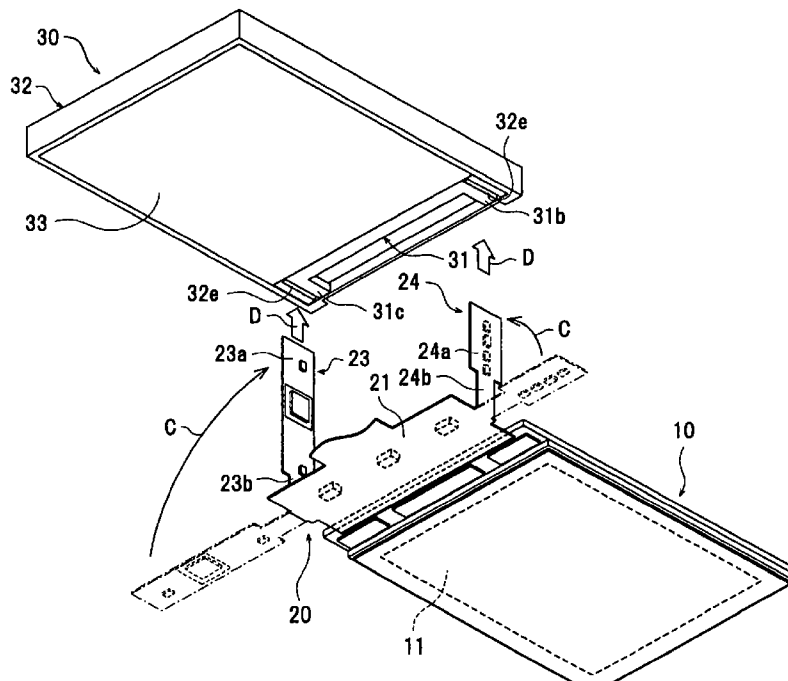


Fig. 1

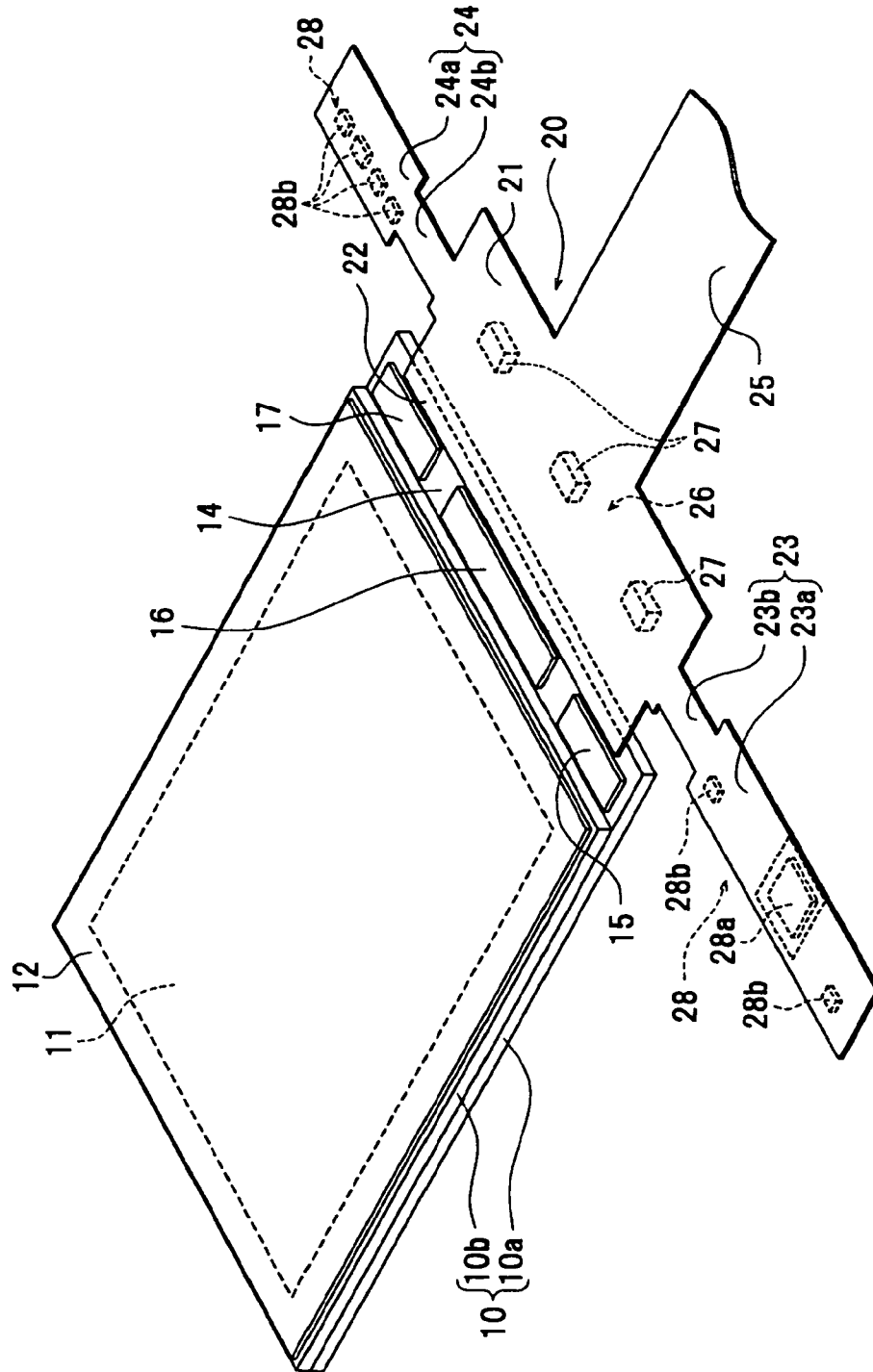


Fig. 2a

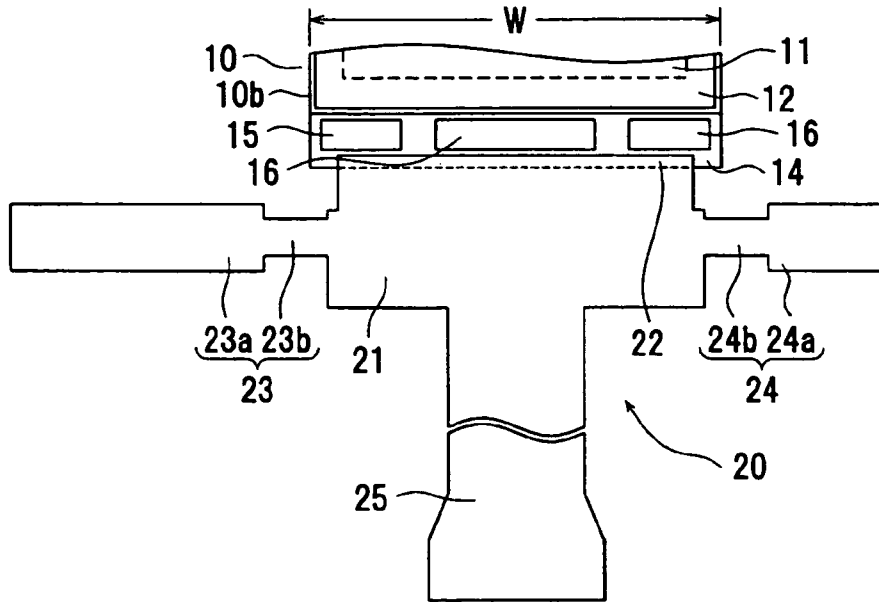


Fig. 2b

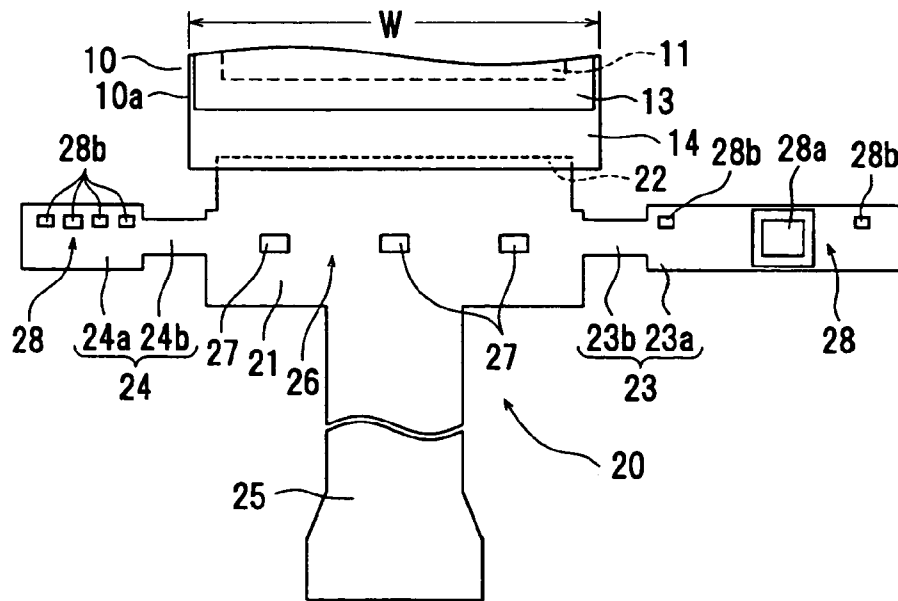


Fig. 3a

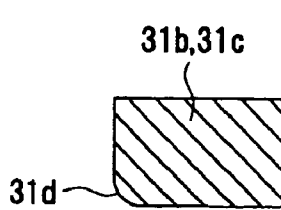
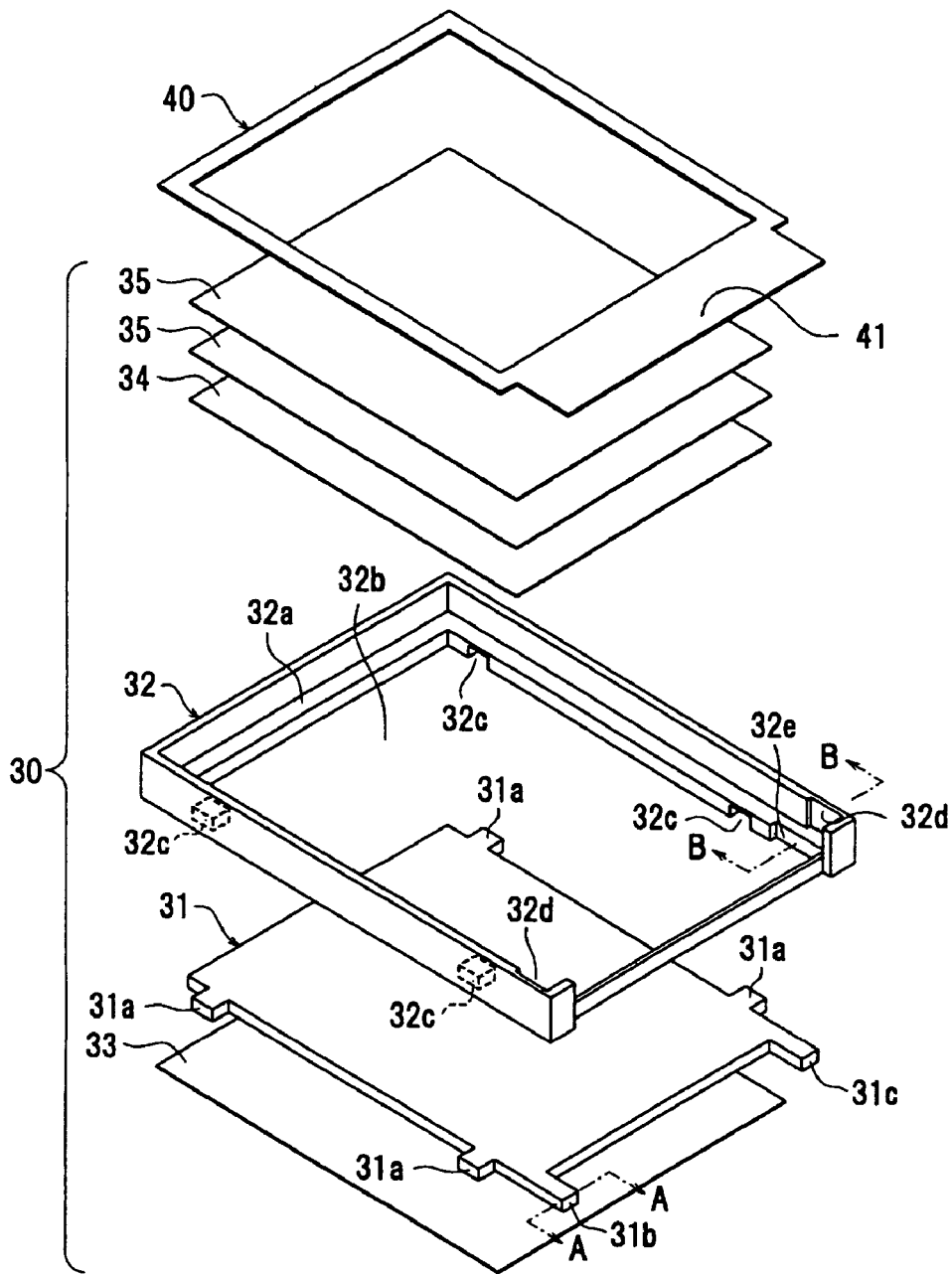


Fig. 3b

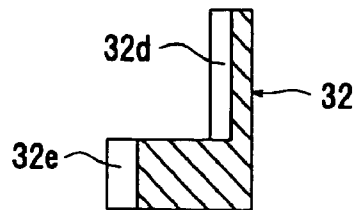
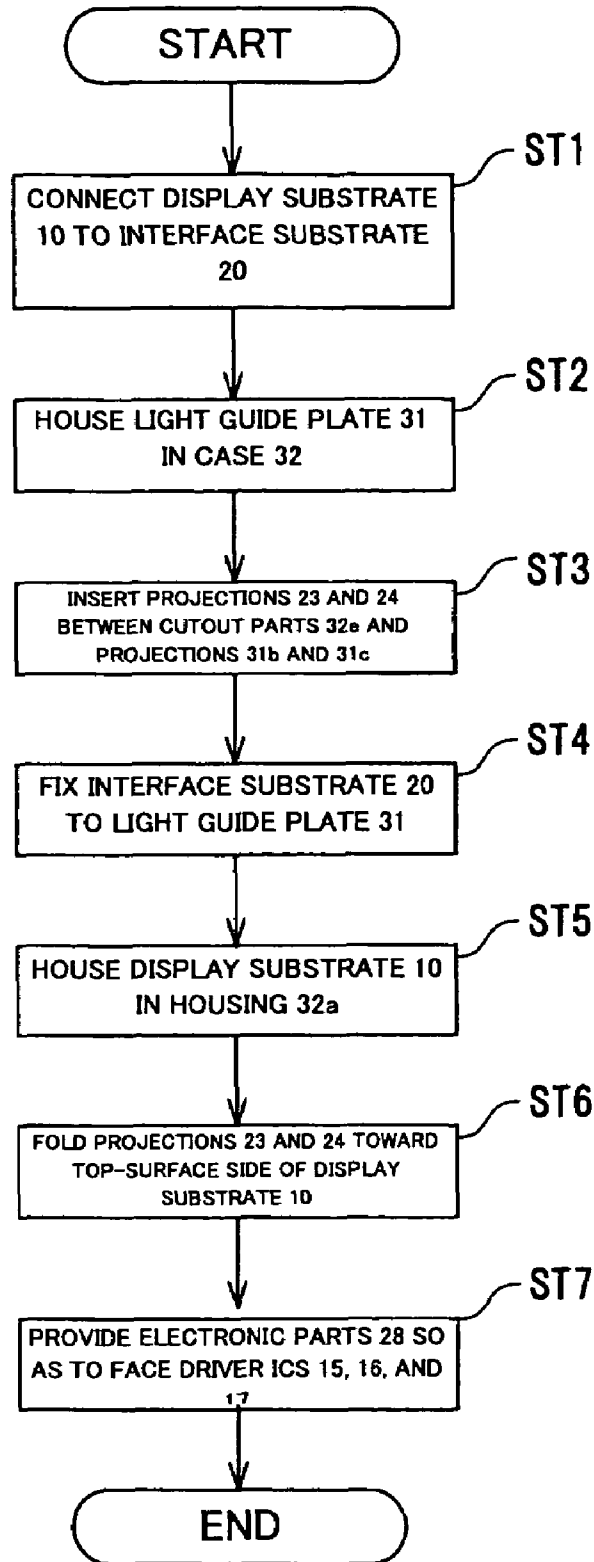


Fig. 3c

Fig. 4



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