



US005347154A

United States Patent [19]

[11] Patent Number: **5,347,154**

Takahashi et al.

[45] Date of Patent: **Sep. 13, 1994**

[54] **LIGHT VALVE DEVICE USING SEMICONDUCTIVE COMPOSITE SUBSTRATE**

2-154232 6/1990 Japan 257/347
3-19370 1/1991 Japan 357/23.7
2206445 1/1989 United Kingdom .

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[73] Assignee: **Seiko Instruments Inc.**, Japan

[21] Appl. No.: **791,912**

[22] Filed: **Nov. 13, 1991**

[30] Foreign Application Priority Data

Nov. 15, 1990 [JP] Japan 2-309437
Jan. 23, 1991 [JP] Japan 3-006561
Feb. 16, 1991 [JP] Japan 3-022420
Apr. 11, 1991 [JP] Japan 3-079330
Apr. 11, 1991 [JP] Japan 3-079337

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Attorney, Agent, or Firm—Bruce L. Adams; Van C. Wilks

[51] Int. Cl.⁵ **H01L 27/01; H01L 27/13**

[52] U.S. Cl. **257/347; 257/353; 359/59; 359/87**

[58] Field of Search 357/4, 23.7; 340/784 C; 359/54, 59, 62, 82, 87, 88; 257/347, 352, 353

[57] ABSTRACT

A semiconductor device having a double-side wiring structure, in which a single crystal semiconductor thin film is formed integrally with transistor elements and is laminated on an insulating thin film. The single crystal semiconductor thin film is formed with through-holes and the insulating thin film is formed on its back side with electrodes and a shielding film. A light valve device using the semiconductor device is also disclosed. Over the single crystal semiconductor thin film, there are formed switching elements of transistors, pixel electrodes connected electrically with the switching elements, and drive circuits for scanning and driving the switching elements. Also disclosed is a miniature highly dense light valve device. In this light valve device, an electrooptical substance is arranged between a multi-layer substrate. The multi-layer substrate is formed with electrodes and a shielding film at the opposed side of the insulating film to the side formed with the grouped elements through the insulating film. A transparent opposite substrate is also formed so that the optical transparency of the electrooptical substance is controlled by the switching elements.

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25 Claims, 19 Drawing Sheets

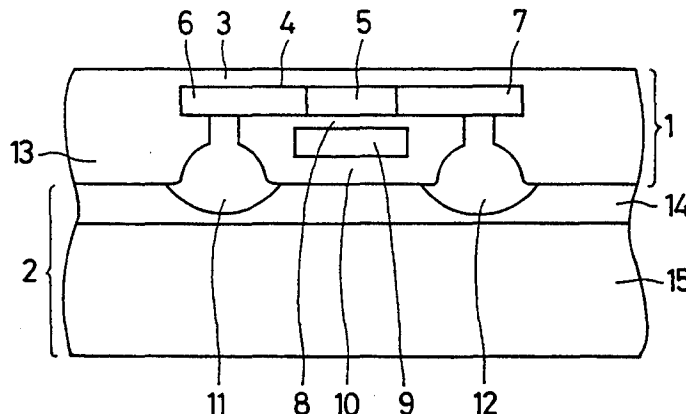


FIG. 1

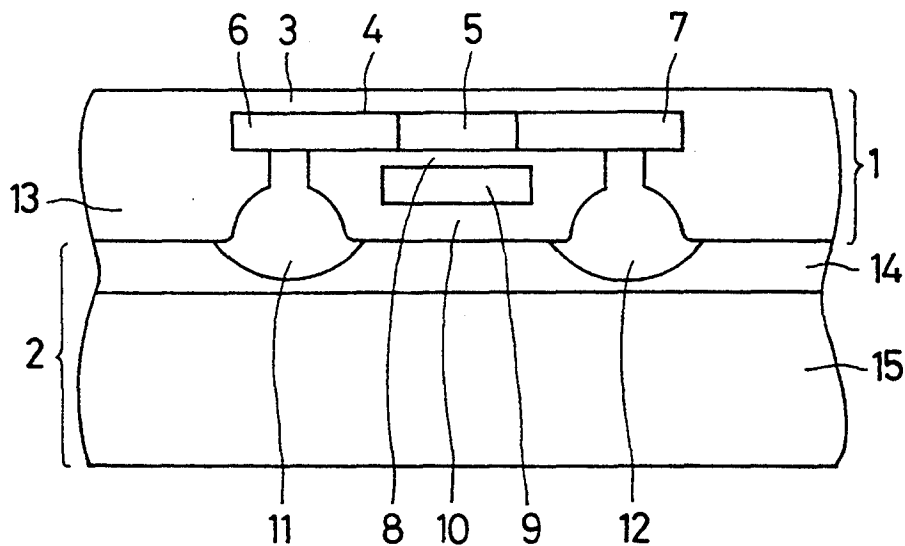


FIG. 2 PRIOR ART

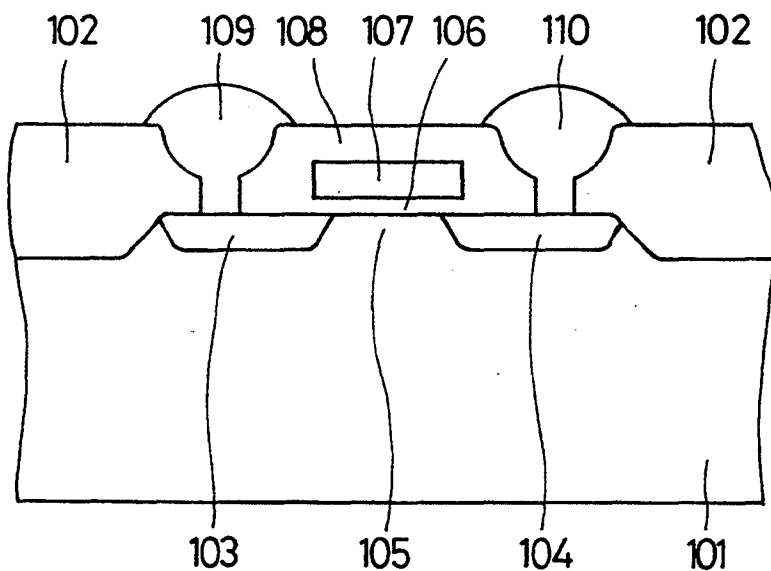


FIG. 3

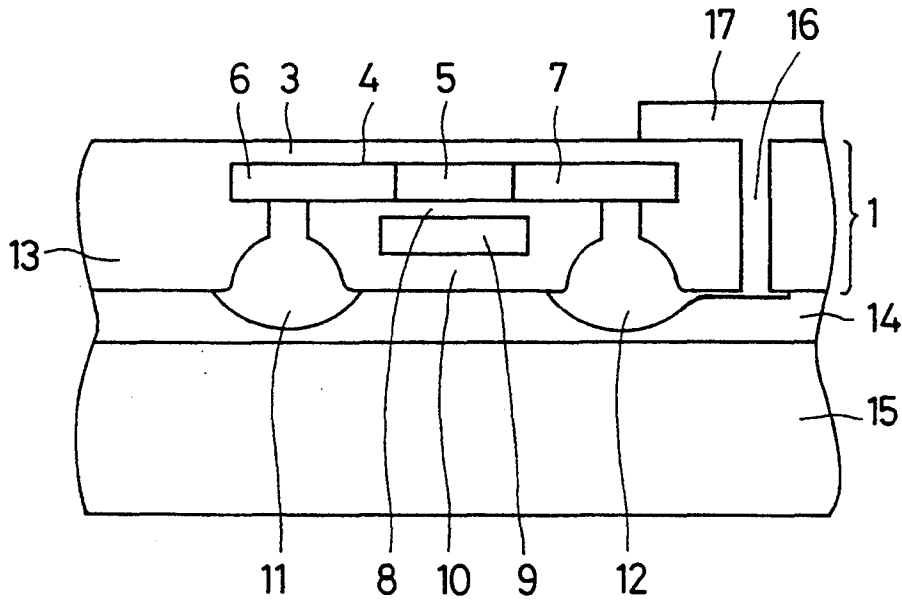


FIG. 4(a)

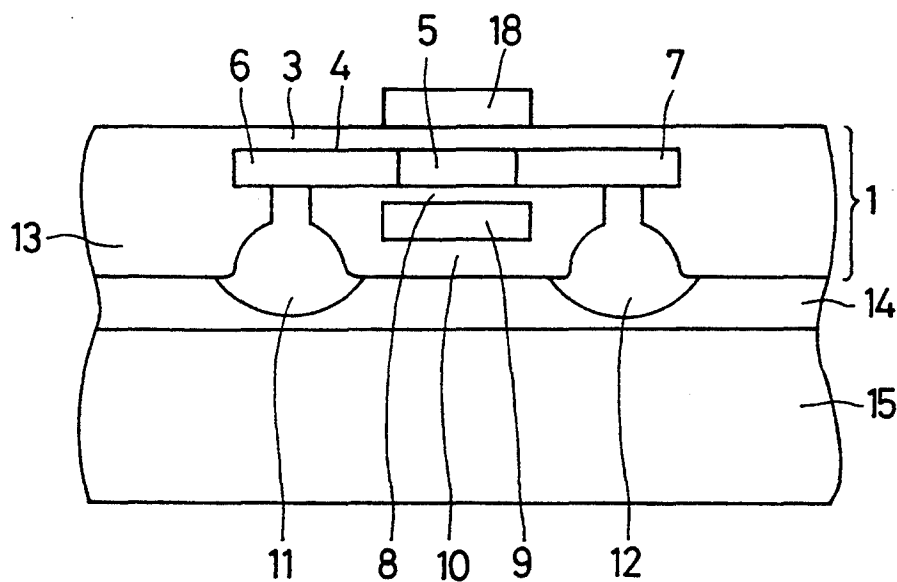


FIG. 4(b)

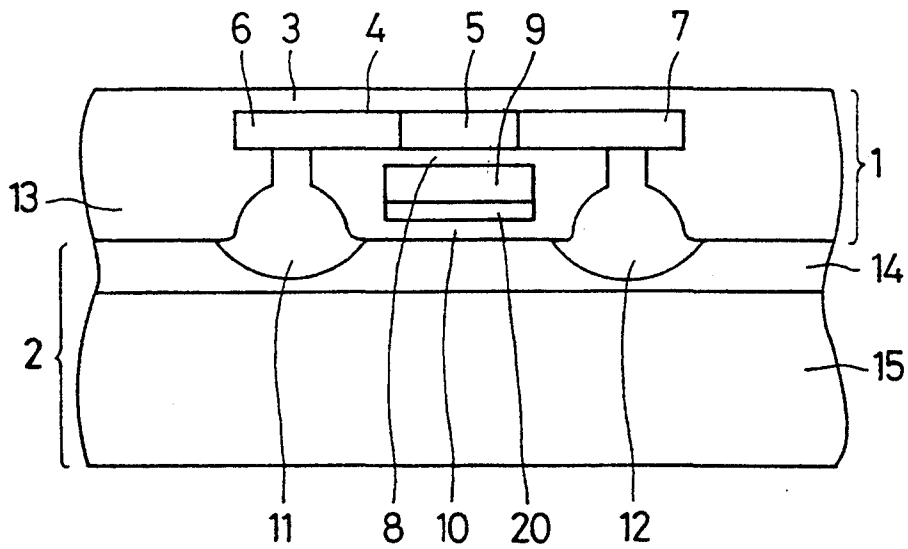


FIG. 5

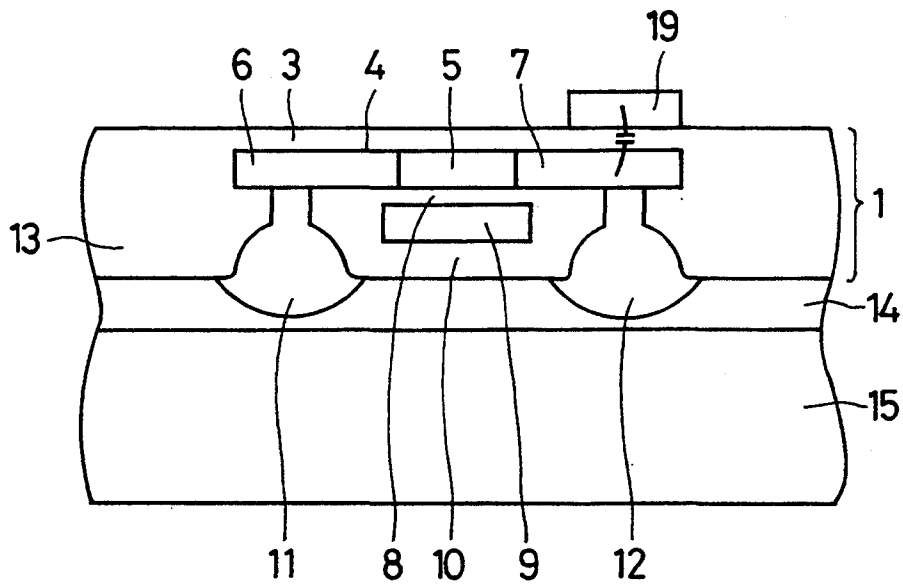


FIG. 6

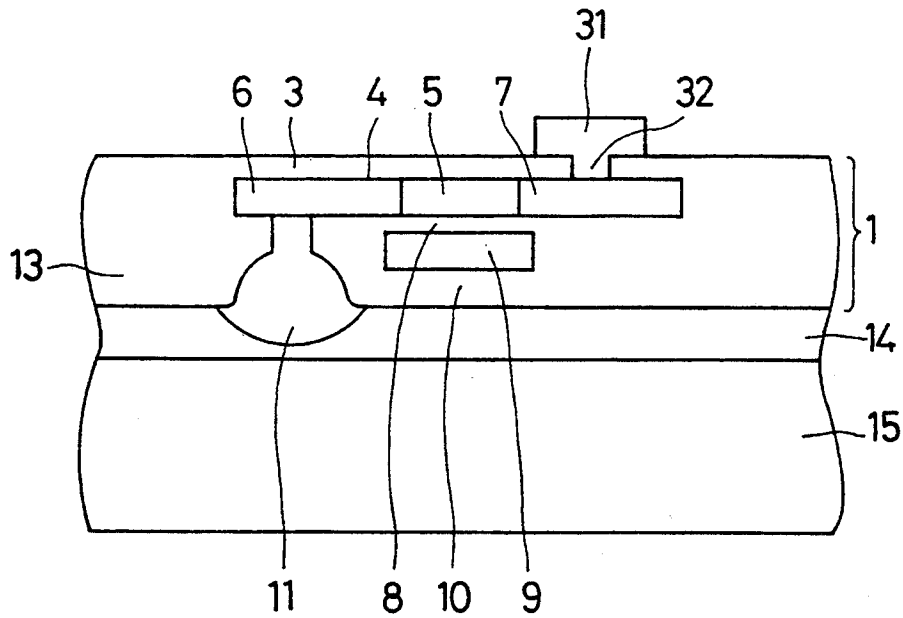
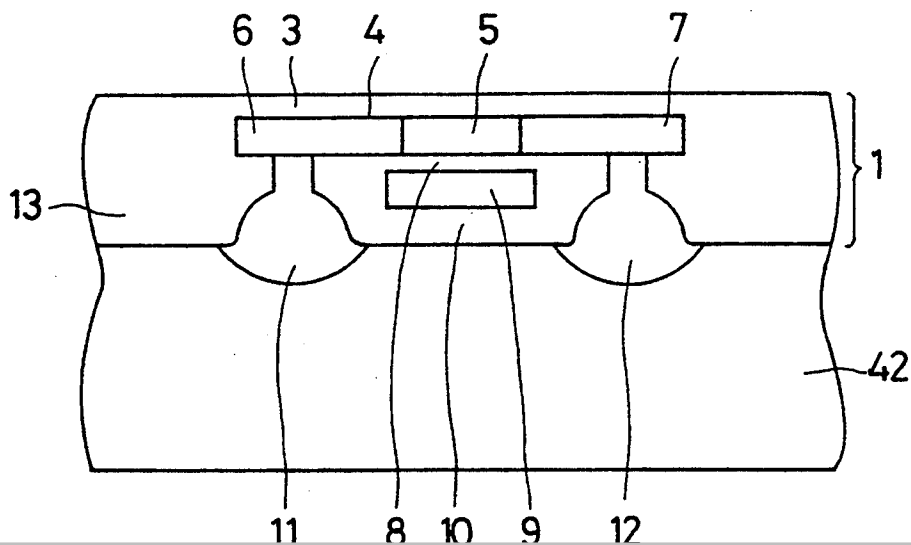


FIG. 7



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