

[54] **SURFACE-TYPE ILLUMINATION DEVICE AND LIQUID CRYSTAL DISPLAY**

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[21] Appl. No.: **204,374**

[22] PCT Filed: **Jul. 13, 1993**

[86] PCT No.: **PCT/JP93/00965**

§ 371 Date: **May 10, 1994**

§ 102(e) Date: **May 10, 1994**

[87] PCT Pub. No.: **WO94/01795**

PCT Pub. Date: **Jan. 20, 1994**

[30] **Foreign Application Priority Data**

Jul. 13, 1992	[JP]	Japan	.....	4-184976
May 13, 1993	[JP]	Japan	.....	5-111852

[51] **Int. Cl.⁶** **G02F 1/1335**

[52] **U.S. Cl.** **349/61; 349/5; 349/62**

[58] **Field of Search** **359/40, 42, 48, 359/49, 50, 70; 362/26, 31, 32, 330**

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,729,067	3/1988	Ohe	.....	362/26
4,842,378	6/1989	Flasck et al.	.....	359/48
4,974,122	11/1990	Shaw	.....	362/32
4,985,809	1/1991	Matsui et al.	.....	362/31
5,057,974	10/1991	Milzobe	.....	362/26
5,130,898	7/1992	Akahane	.....	362/31
5,134,549	7/1992	Yokoyama	.....	362/31
5,283,673	2/1994	Murase et al.	.....	359/49
5,363,294	11/1994	Yamamoto et al.	.....	362/330

FOREIGN PATENT DOCUMENTS

0317250	5/1989	European Pat. Off.	.
0442529	8/1991	European Pat. Off.	.
2632432	12/1989	France	.
54-40086	3/1979	Japan	.
166585	7/1986	Japan	.
62-102226	5/1987	Japan	.
63-45537	3/1988	Japan	.
63-124217	8/1988	Japan	.
1183626	7/1989	Japan	.
351476	5/1991	Japan	.
4102888	4/1992	Japan	.
8808149	10/1988	WIPO	.

OTHER PUBLICATIONS

"Advancements in Backlighting Technologies for LCDs," K. Hathaway, Spie Proceedings, High-Resolution Displays and Projection Systems, vol. 1664, Feb. 1992, pp. 108-116. Abstract for 62-102226 May 12, 1987, Japan.

Primary Examiner—William L. Sikes

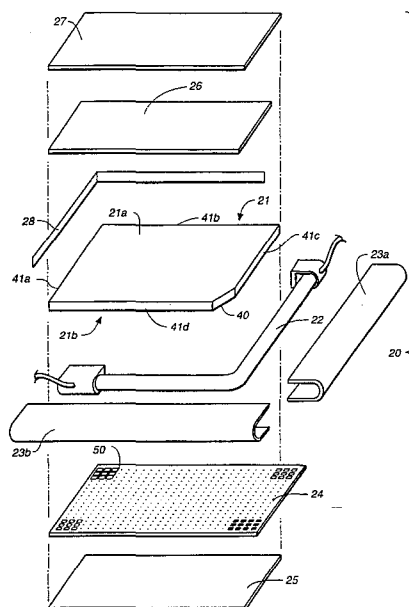
Assistant Examiner—James A. Dudek

Attorney, Agent, or Firm—Eric B. Janofsky

[57] **ABSTRACT**

A surface-type illumination device suitable for providing backlight in a liquid crystal display is disclosed. For example, an L-shaped fluorescent light can be used as an illuminant and mounted next to two edges of a substantially rectangular light guide plate. The corner of an edge portion between the two edges is removed. The fluorescent light, the length of whose illuminating portion is long, is positioned with an appropriate gap from the light guide plate allowing for illumination with high brightness and low power consumption. Consequently, when the illumination device is used in a color liquid crystal display, appropriate backlight with high brightness can be obtained. Moreover, because the influence of the temperature from the illumination device is small, a stable color display can be achieved.

18 Claims, 12 Drawing Sheets



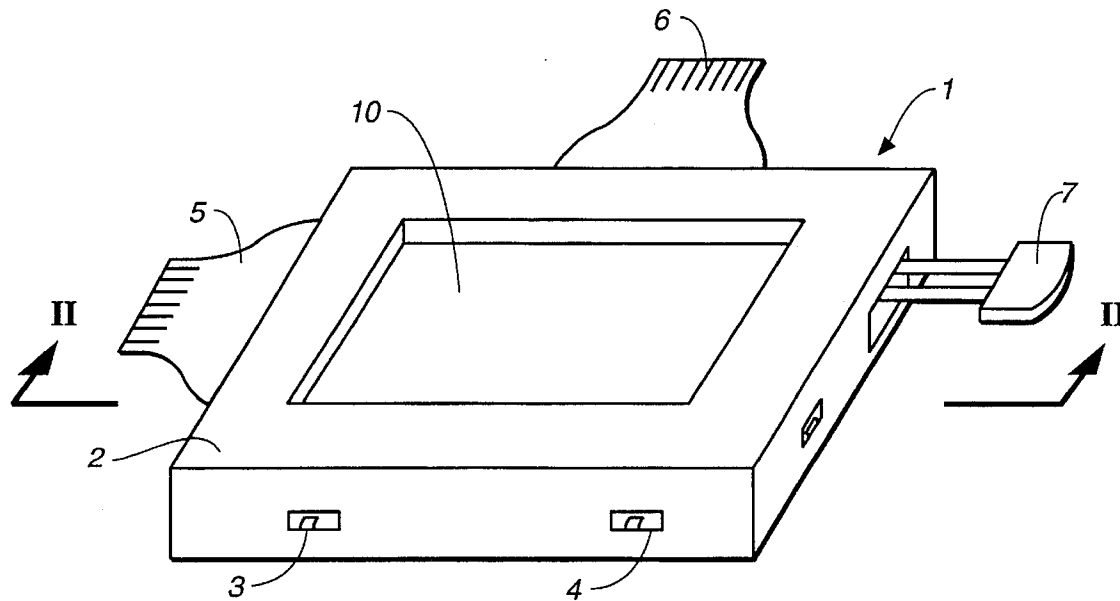


FIG. 1

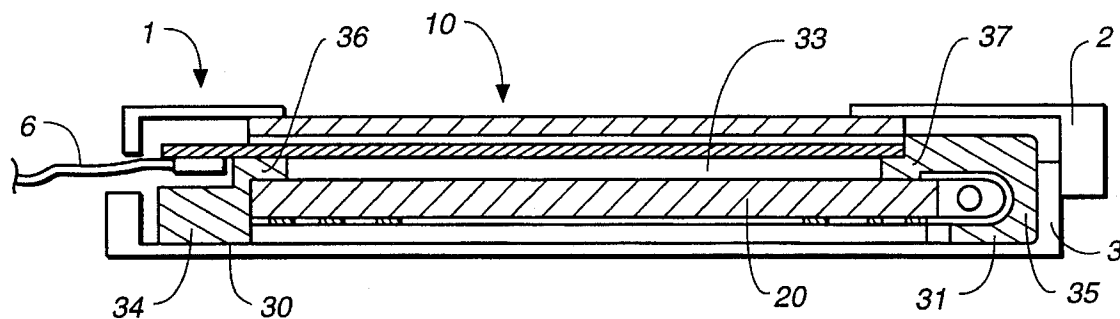


FIG. 2

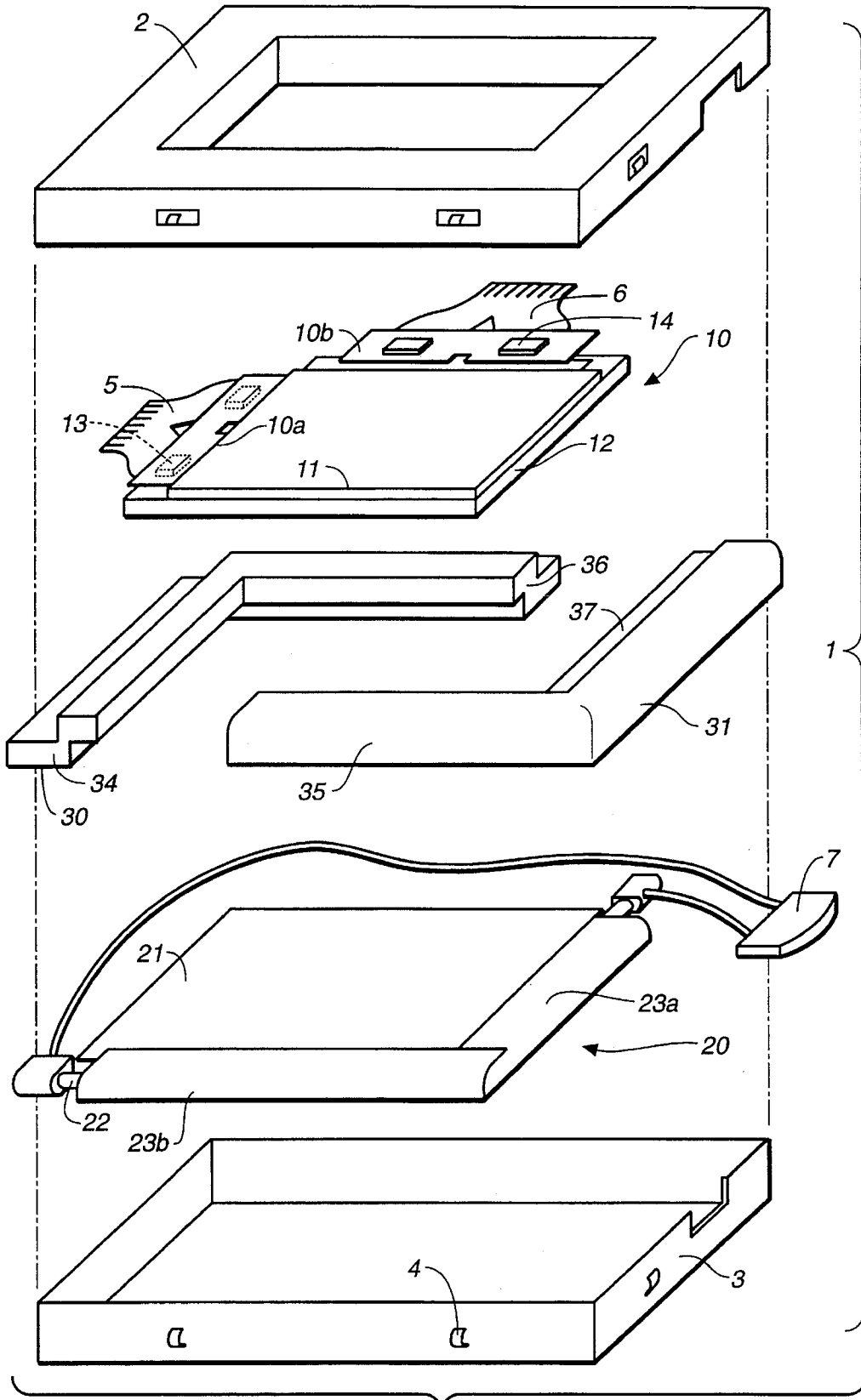


FIG. 3

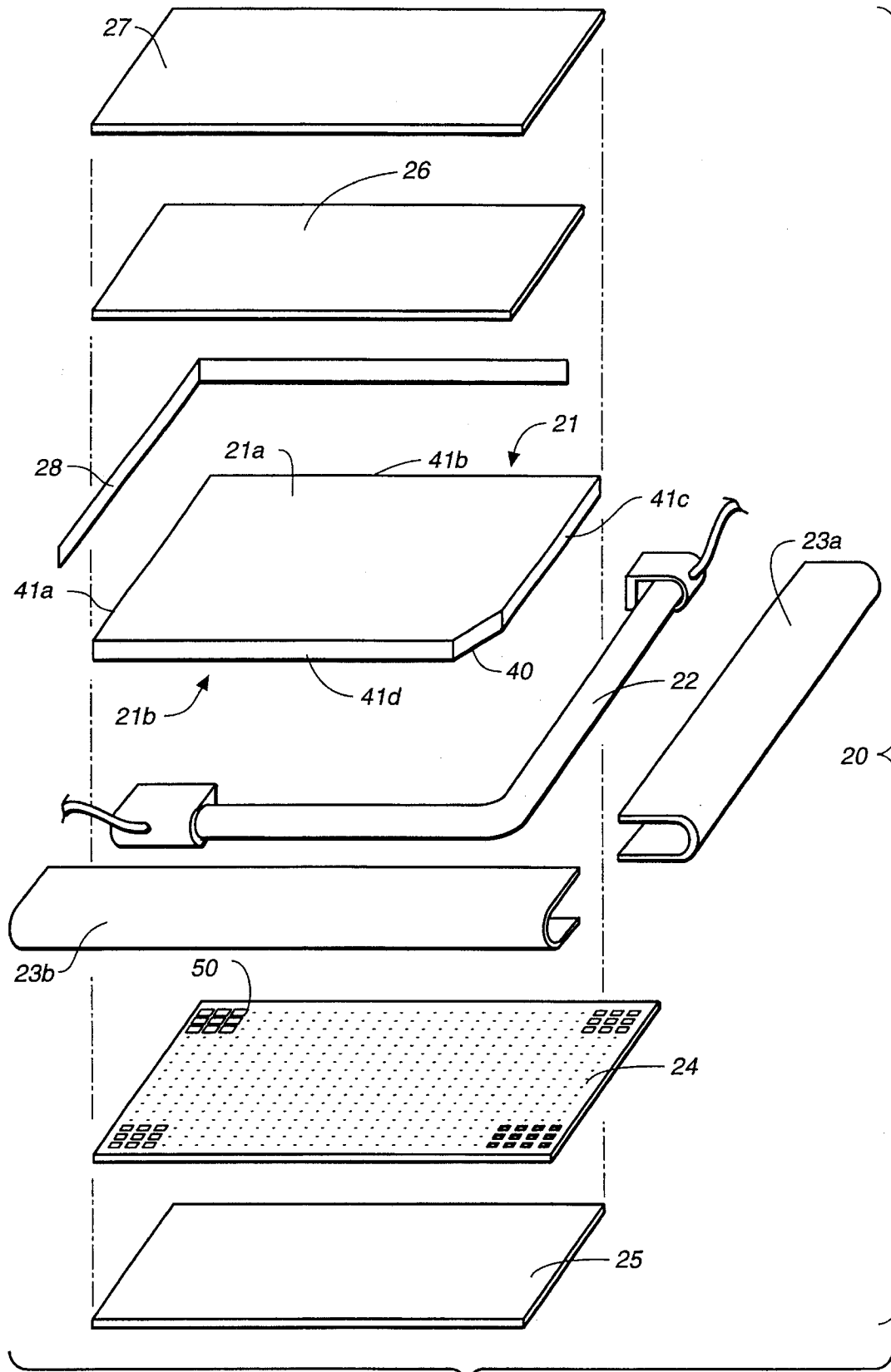


FIG. 4

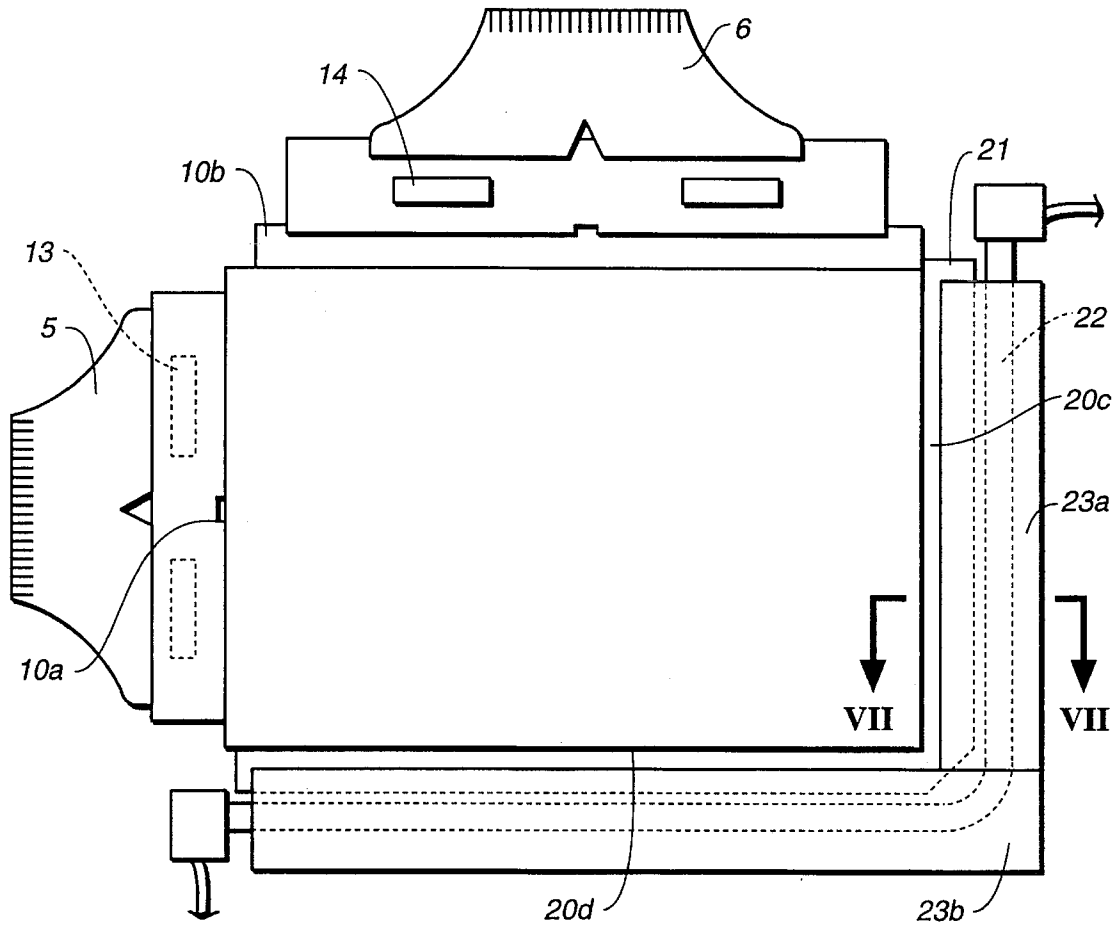


FIG. 5

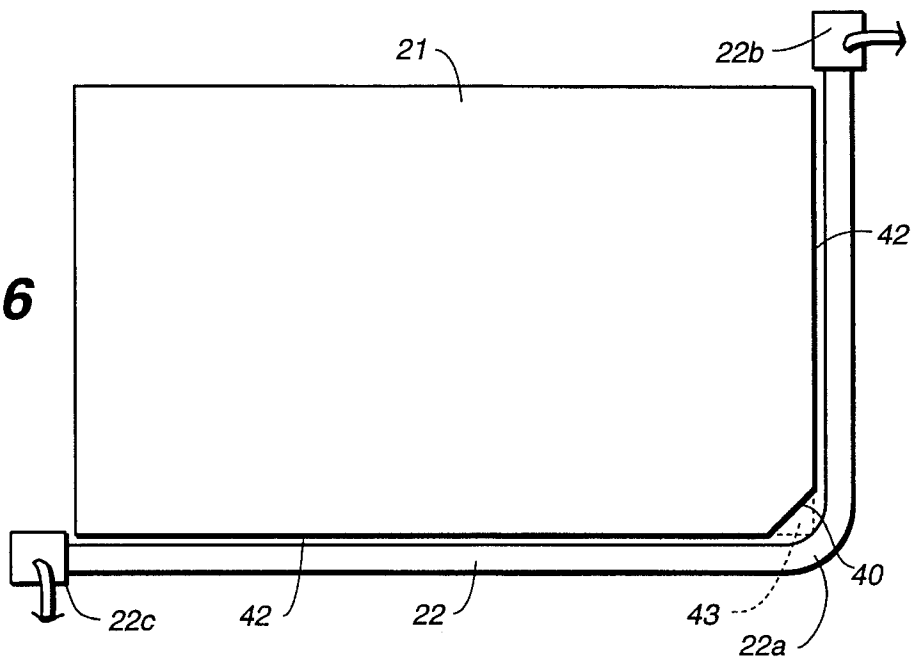


FIG. 6

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