



United States Patent [19]

Sakuma et al.

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[45] Date of Patent: **Apr. 2, 1996**

[54] **LIQUID CRYSTAL DISPLAY MODULE HAVING CUT-AWAY PORTIONS OF THE BACK FRAME FOR WEIGHT REDUCTION AND HEAT DISSIPATION**

5,432,626 7/1995 Sasuga 359/83

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[57] ABSTRACT

[21] Appl. No.: **250,429**

It is possible to reduce the thickness and size of a liquid crystal display module and to suppress any display irregularity due to the heat generation of a light source, by providing a liquid crystal display module which is characterized by an upper frame 1 made of a thin stainless steel sheet and a lower frame 2 made of a thin aluminum sheet thereby to reduce the thickness of an intermediate frame 42, and to form the lower frame 2 with cut-away portions 55 and 56, which extend in a direction perpendicular to a back light source 36 over at least the area of a liquid crystal display panel 62 and which are positioned symmetrically to the line perpendicular to the center portion of the back light source 36, cut-away portions 57 and 58, which extend just below the back light source 36 in the longitudinal direction of the back light source 36, and notches 53 and 54 which are positioned below the two end portions of the back light source 36.

[22] Filed: **May 27, 1994**

[30] Foreign Application Priority Data

Jun. 2, 1993 [JP] Japan 5-132171

[51] Int. Cl.⁶ **G02F 1/1333; G02F 1/1335**

[52] U.S. Cl. **359/83; 359/49**

[58] Field of Search 359/49, 83

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14 Claims, 10 Drawing Sheets

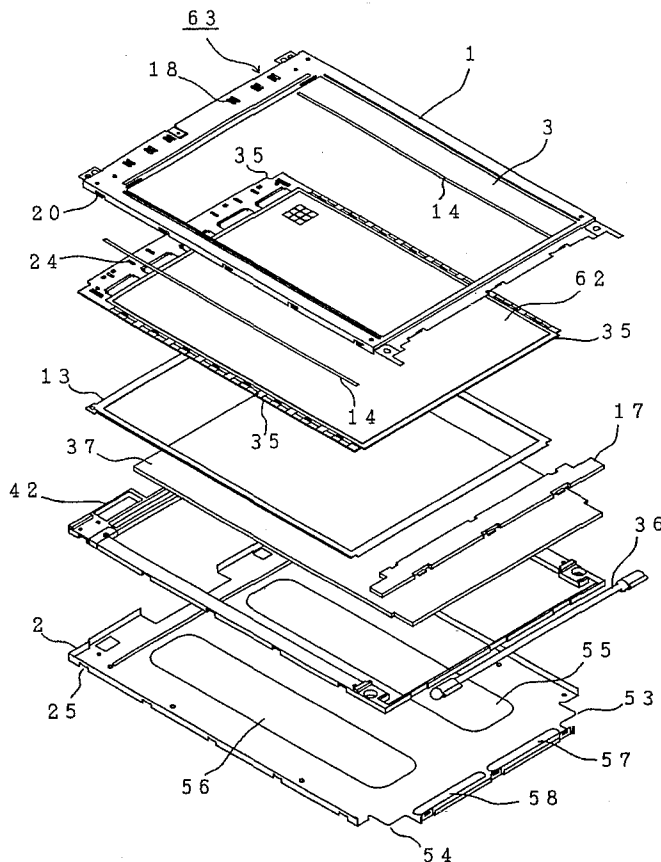


FIG. 1

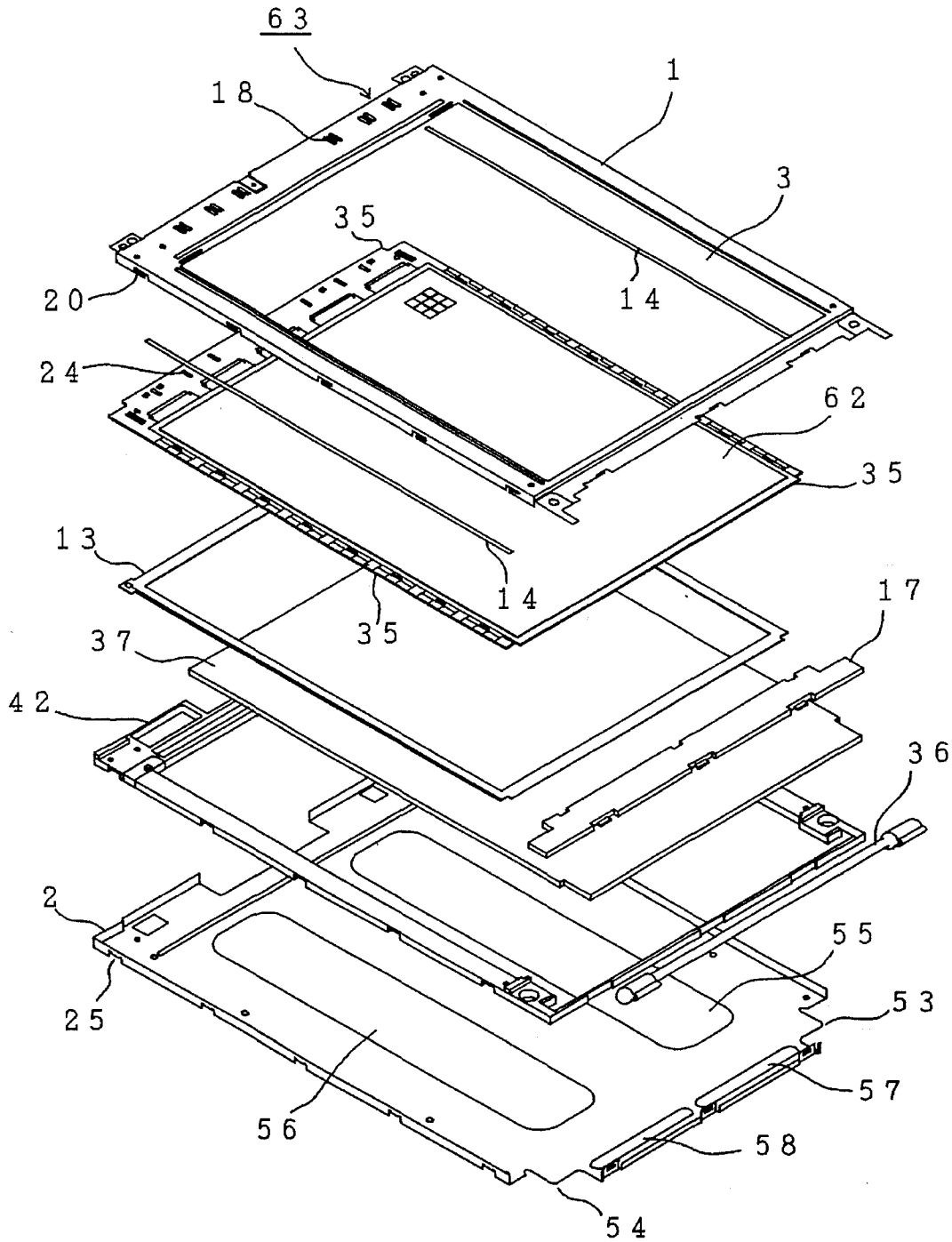


FIG. 2

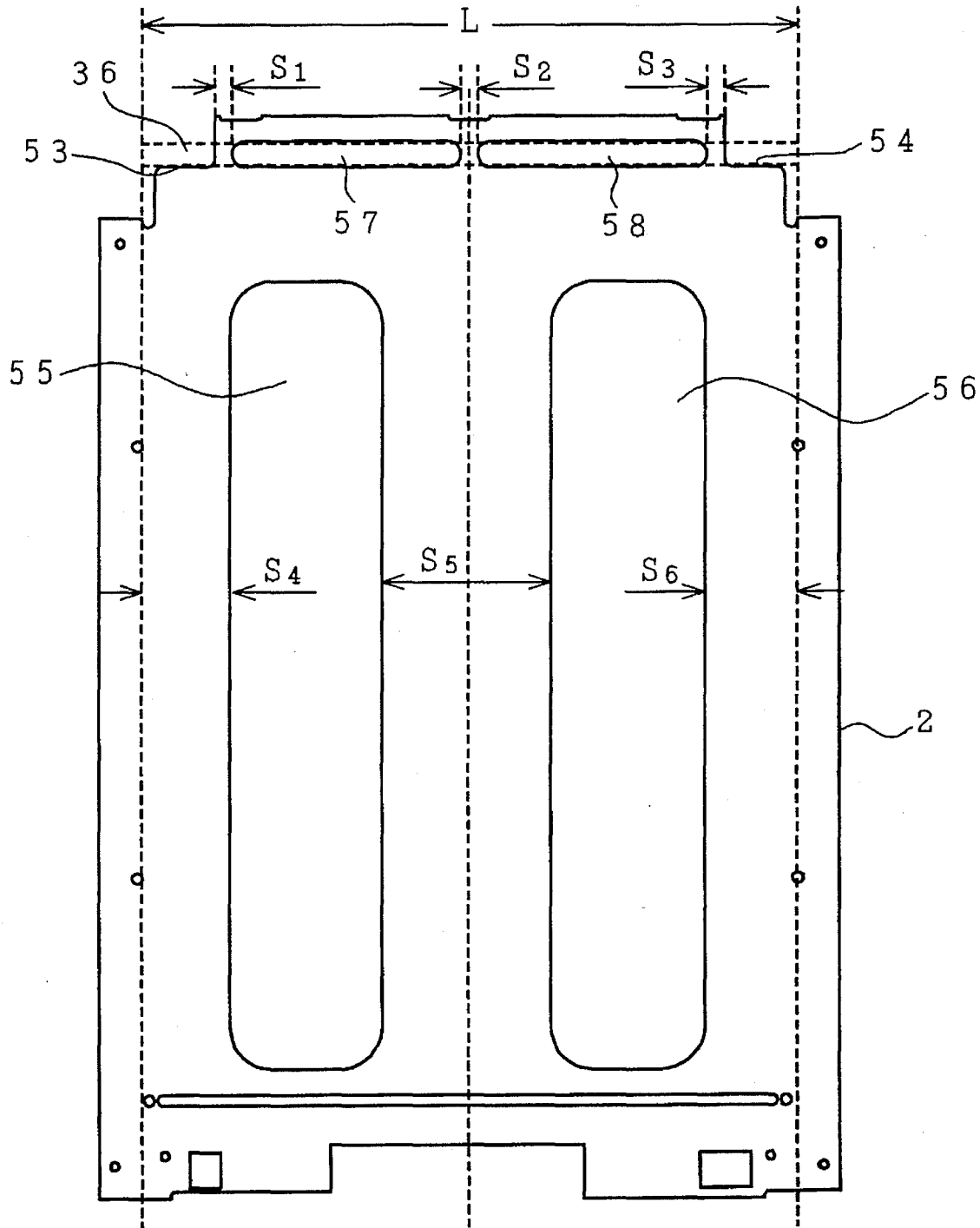


FIG. 3

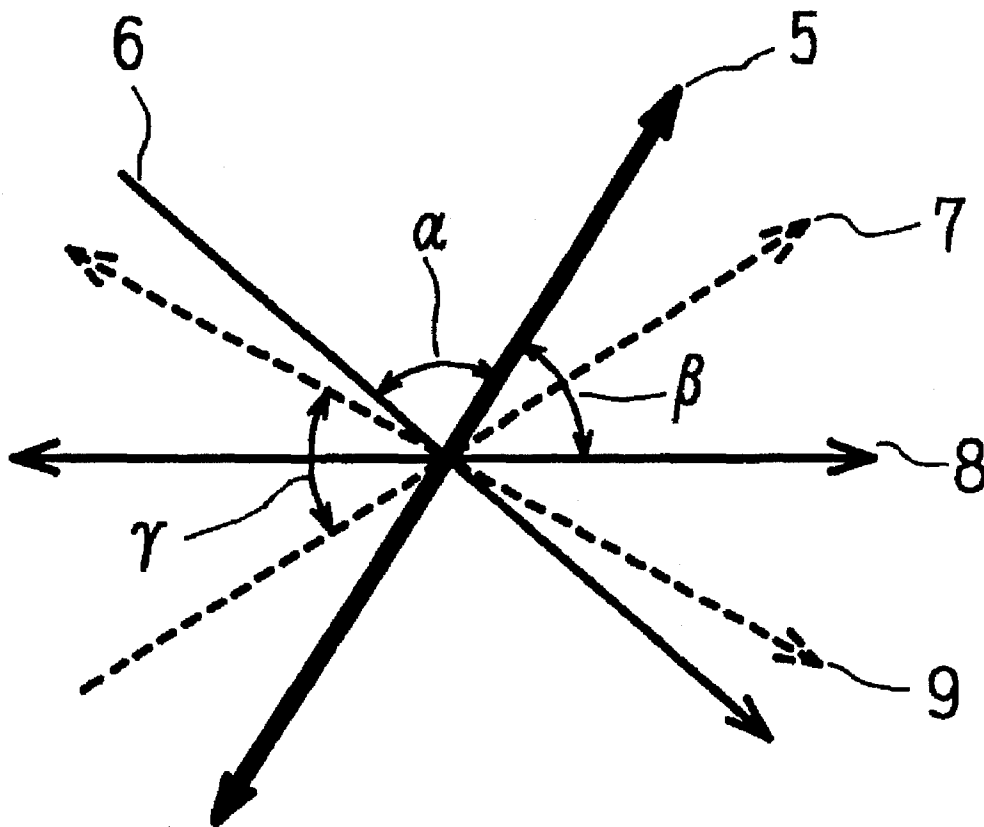
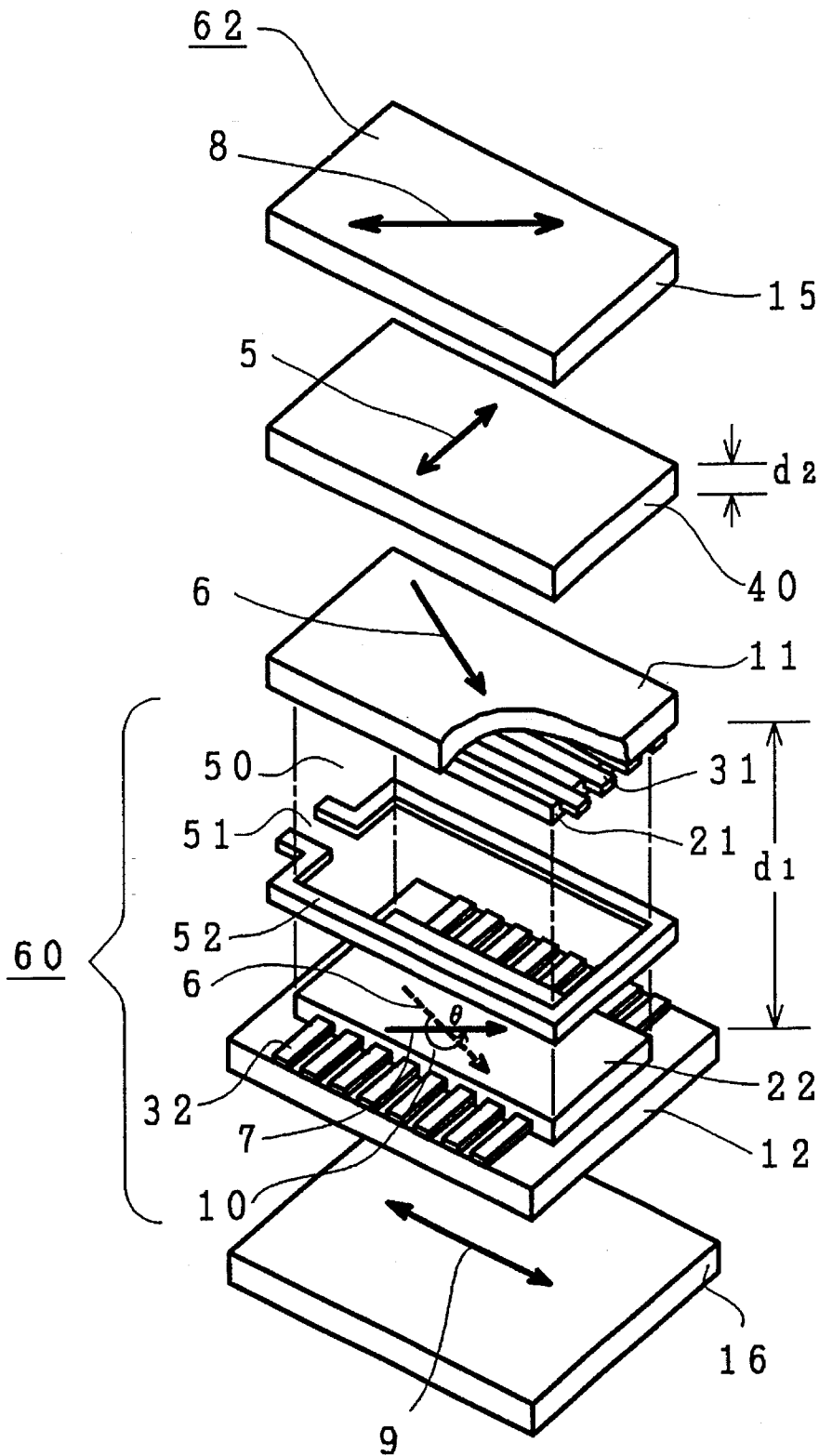


FIG. 4



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