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United States Patent [19]

Borchardt

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[54] **BACKLIT DISPLAY WITH ENHANCED VIEWING PROPERTIES**

[75] Inventor: **Jerry L. Borchardt**, Maple Grove, Minn.

[73] Assignee: **Honeywell Inc.**, Minneapolis, Minn.

[21] Appl. No.: **130,084**

[22] Filed: **Sep. 30, 1993**

[51] **Int. Cl.**[6] **F21V 13/00**

[52] **U.S. Cl.** **362/31**; 362/26; 362/27; 362/30; 362/331

[58] **Field of Search** 362/800, 26, 30, 27, 362/31, 331, 332, 333; 40/546

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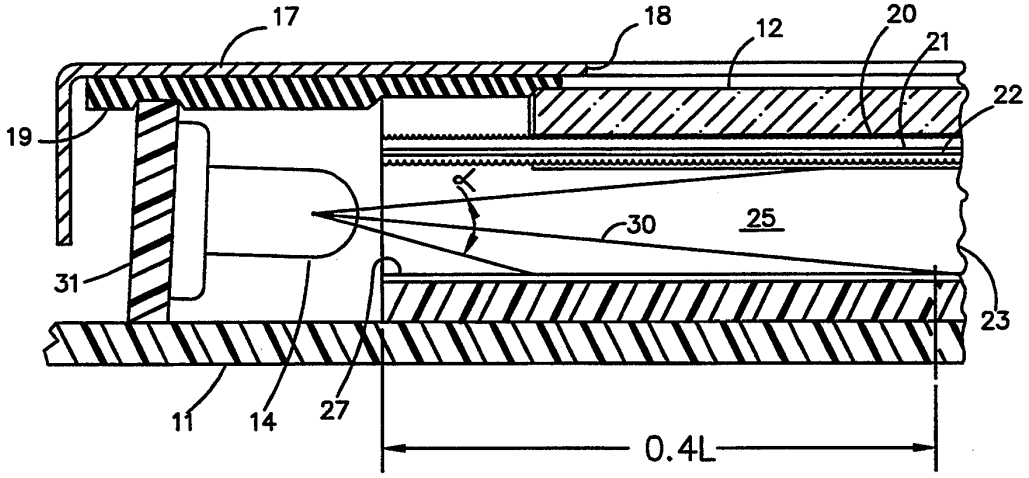
[57] **ABSTRACT**

A high aspect ratio, backlit liquid crystal display in which light from opposing rows of light emitting diodes is projected into the ends of a thin optical cavity. The optical cavity is bounded by one major wall of which the interior surface is specularly reflective and an opposing major wall including a layer of transparent material having an interior surface formed with an array of regularly spaced, fine, triangular prisms which tend to collimate light received from the cavity and project it outwardly perpendicular to the major wall. A diffusion layer overlays the layer of transparent material, and a brightness enhancing film overlays the diffusion layer and functions to convert diffuse illumination received through the diffusion layer into directed illumination predominantly falling within the a viewing space bounded by predetermined angles.

10 Claims, 4 Drawing Sheets



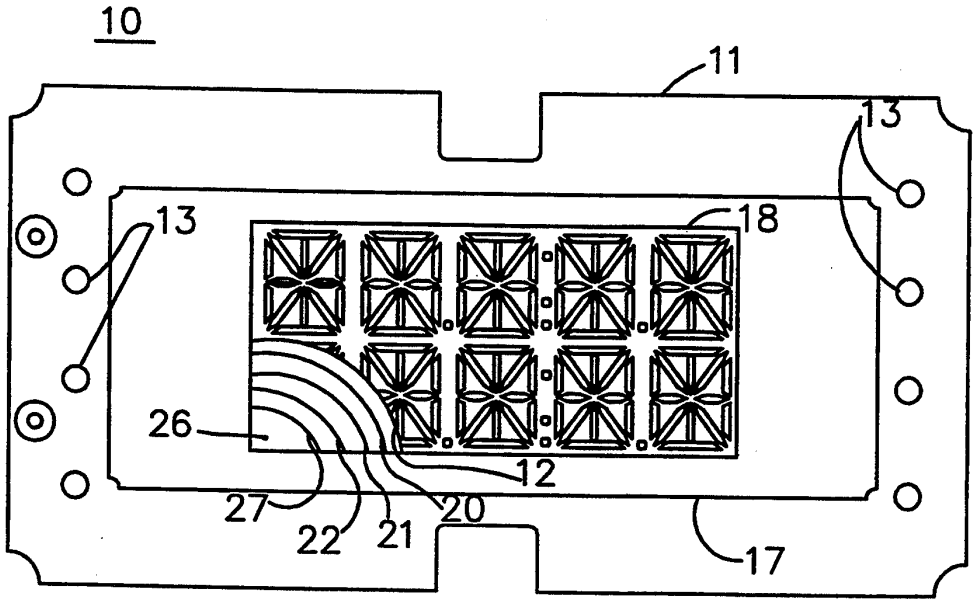


Fig. 1

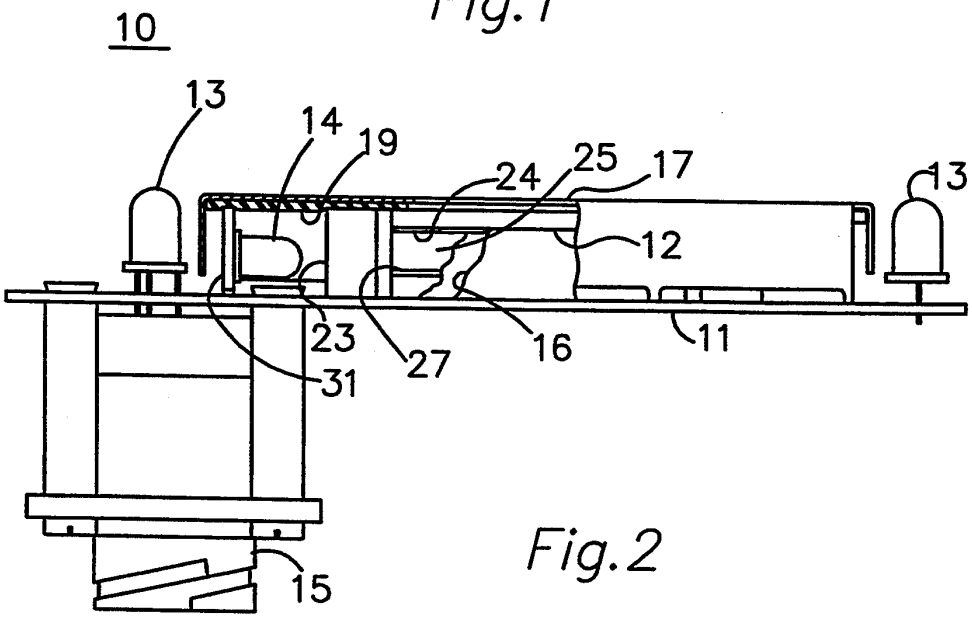


Fig. 2

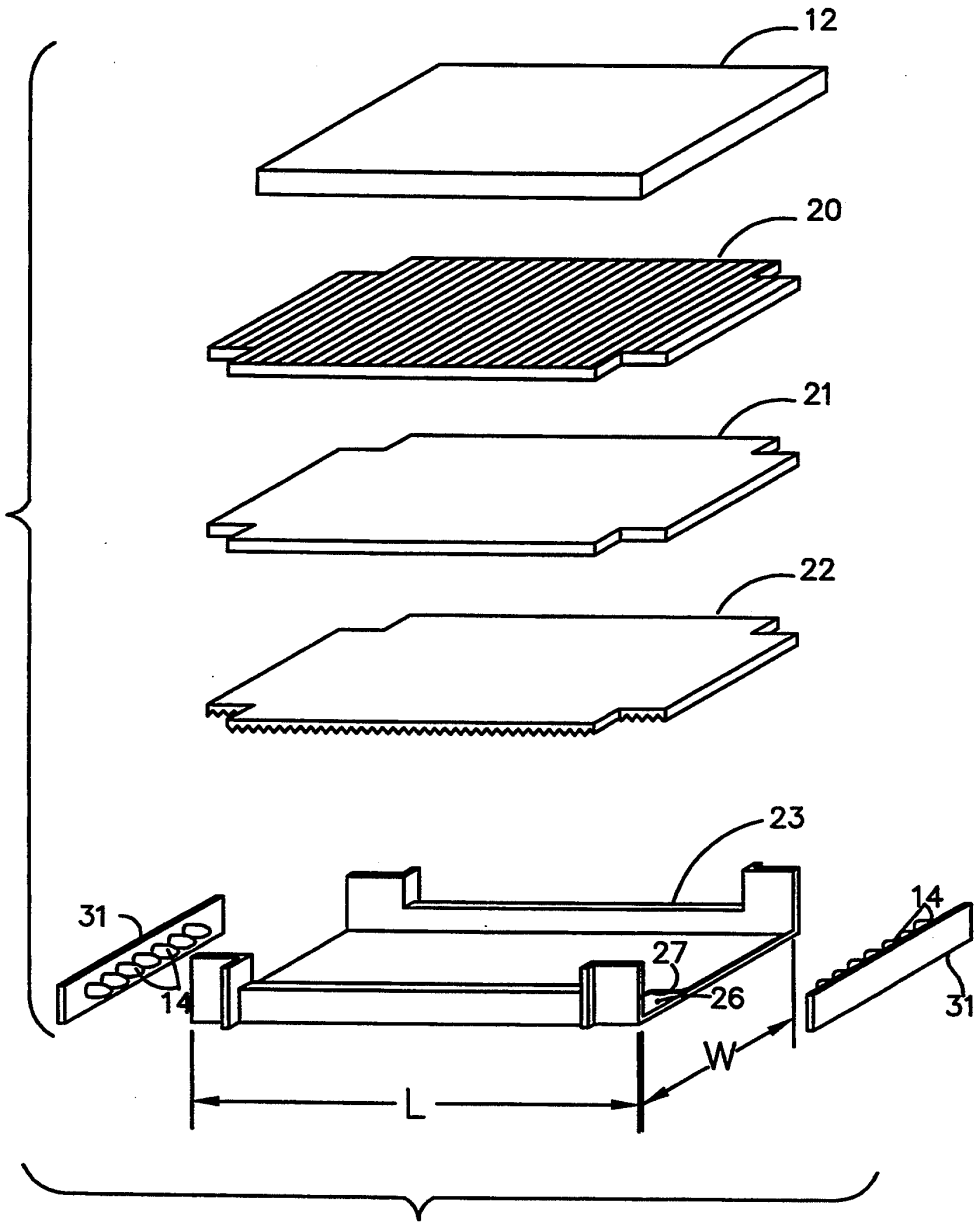


Fig. 3

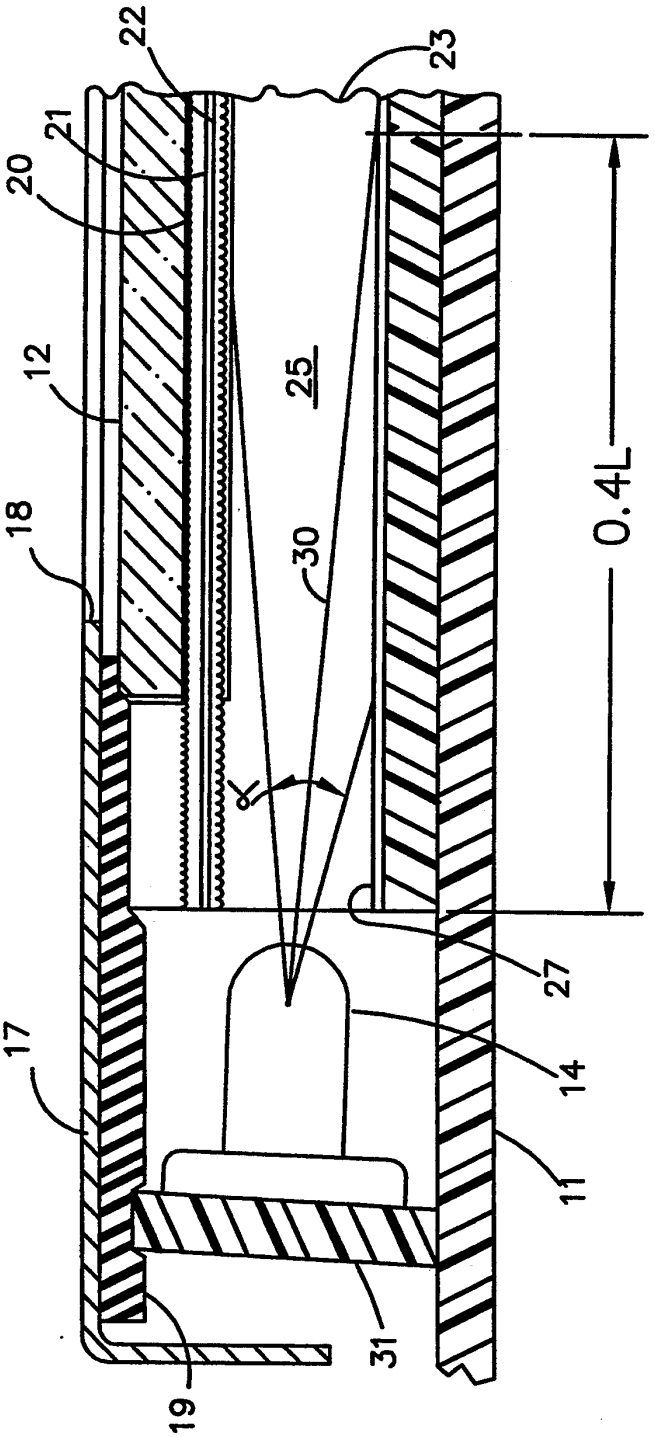


Fig. 4

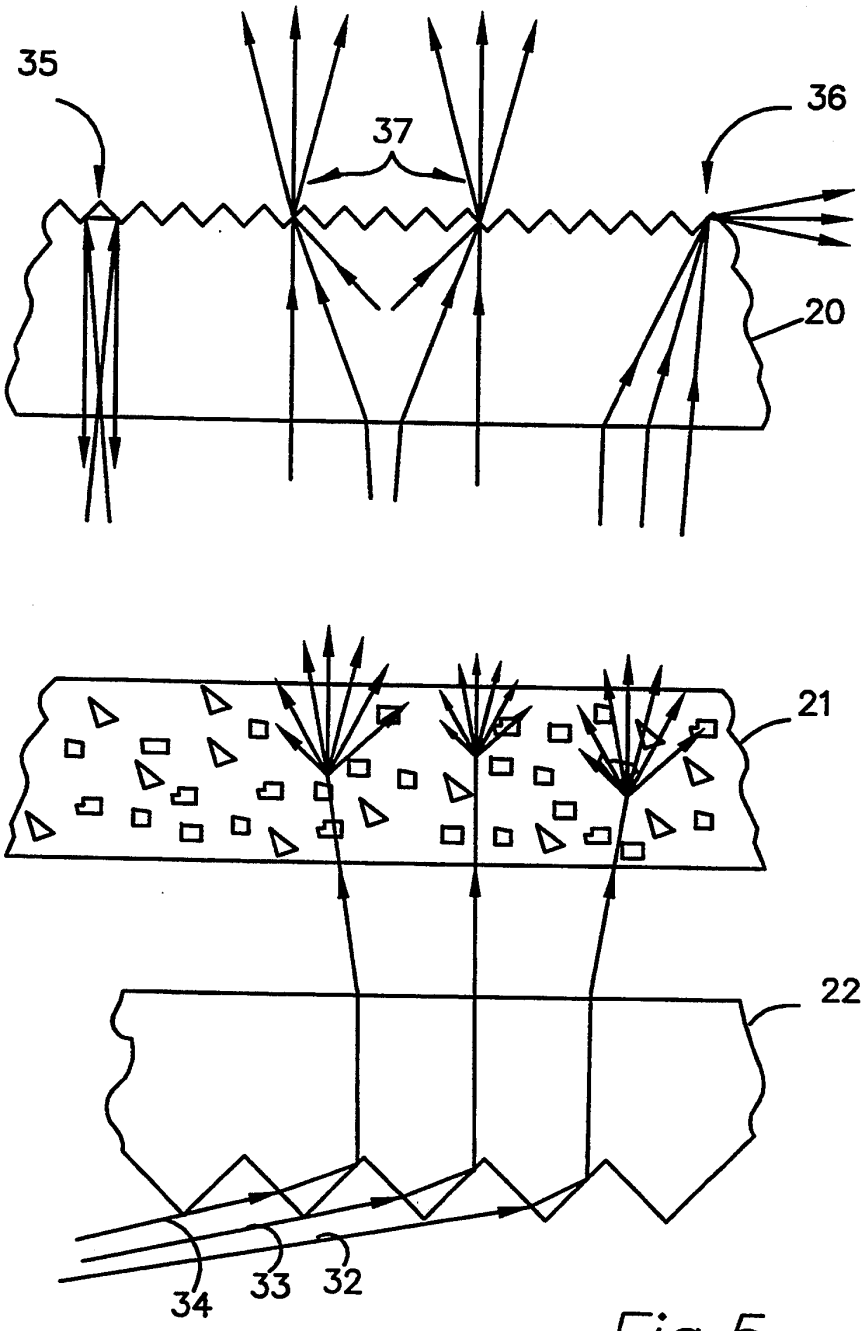


Fig. 5

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