

[54] **BACKLIGHTING APPARATUS EMPLOYING AN ARRAY OF MICROPRISMS**

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[51] Int. Cl.⁶ **G02F 1/1335**

[52] U.S. Cl. **359/40; 359/48; 359/251; 353/81**

[58] Field of Search **359/40, 42, 48, 49, 359/245, 246, 247, 251; 353/33, 81**

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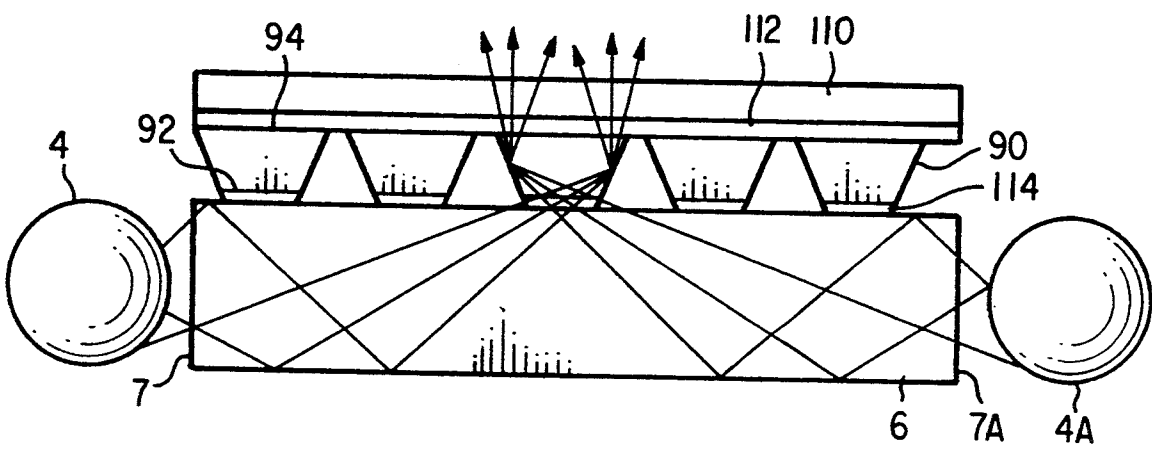
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[57] **ABSTRACT**

An improved backlighting apparatus comprising a slab waveguide that accepts light rays generated by a light source and transmits the light rays via total internal reflection. Attached on one face of the slab waveguide is an array of microprisms, with each microprism having an light input surface parallel to a light output surface and at least one sidewall tilted at an angle from the direction normal to the surface of the waveguide such that light rays escape from the slab waveguide, reflect off the tilted sidewall and emerge from the microprism as a light source substantially perpendicular to the light output surface. An array of microlenses may be positioned to accept the output of the microprisms so that the light exiting from the microlenses is substantially more perpendicular. The backlight apparatus is advantageously used as a backlighting means for flat panel electronic displays.

19 Claims, 10 Drawing Sheets



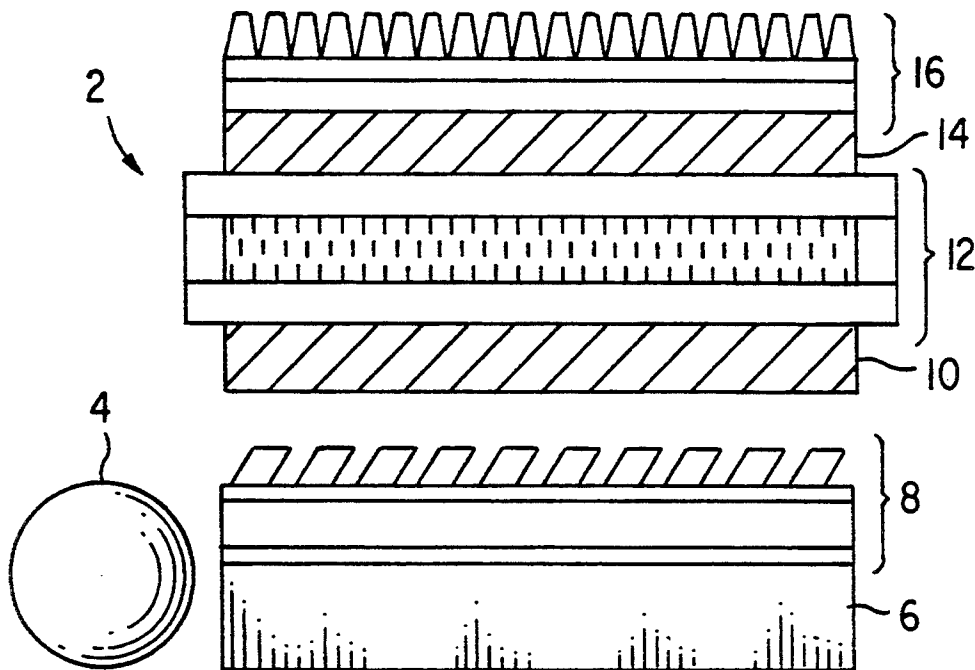


FIG. 1

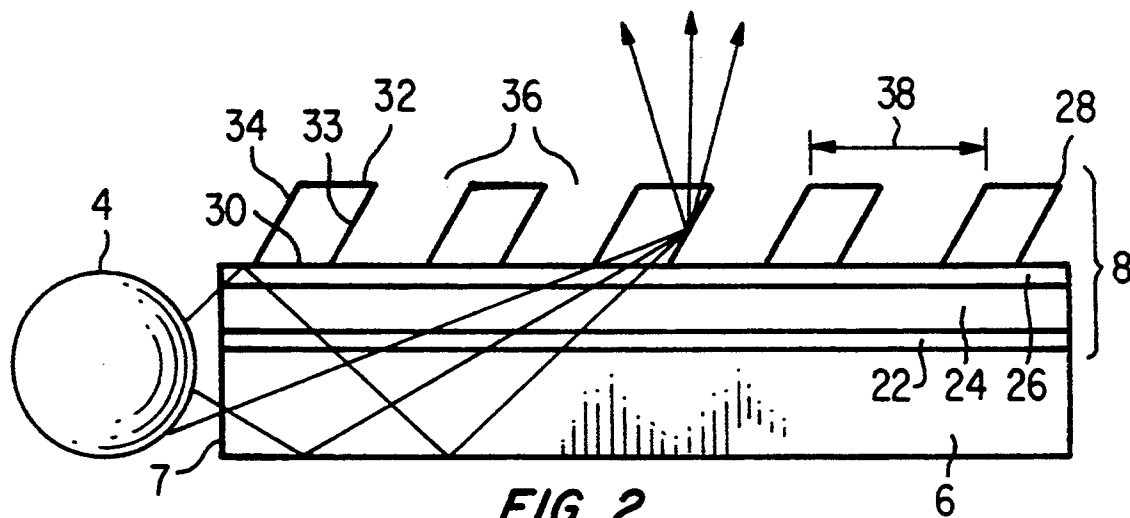


FIG. 2

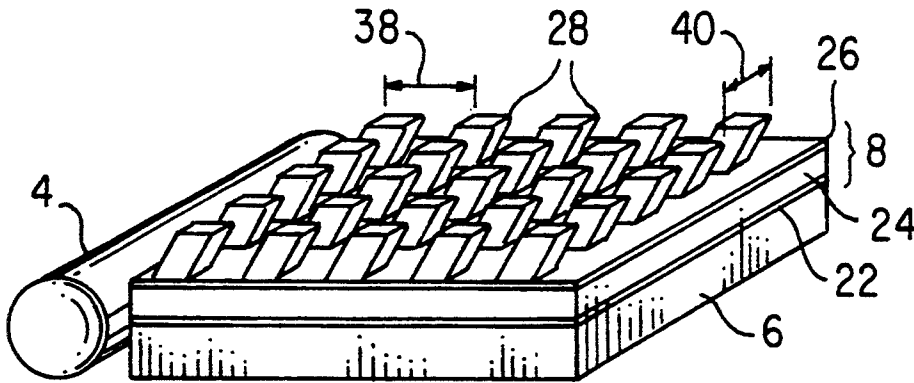


FIG. 3A

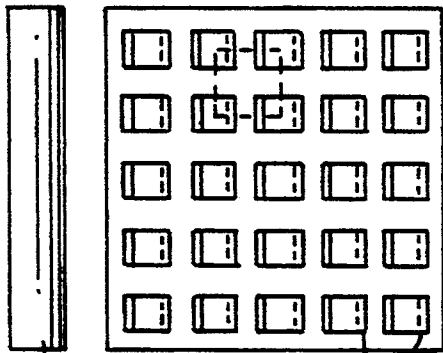


FIG. 3B

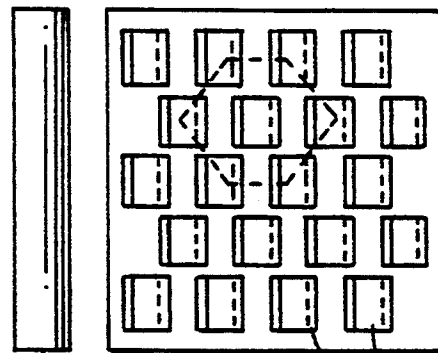


FIG. 3C

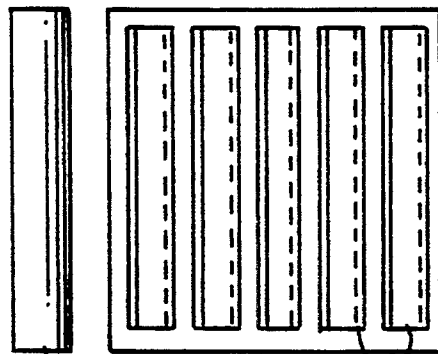
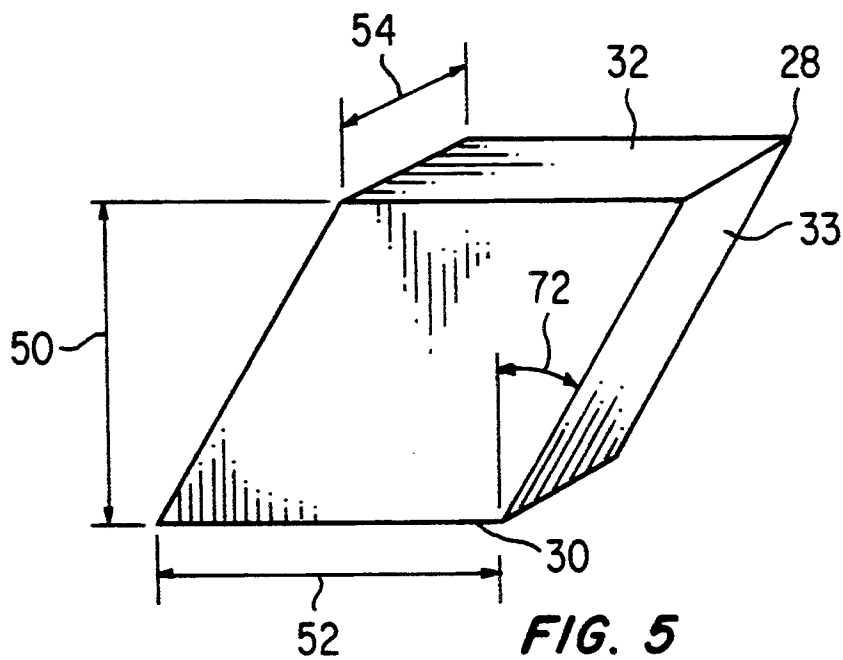
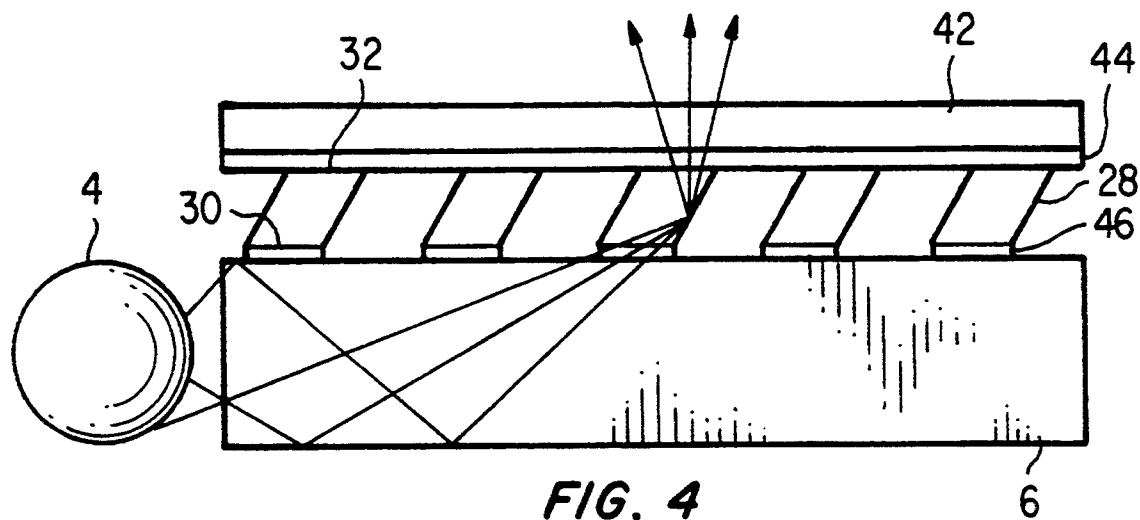


FIG. 3D



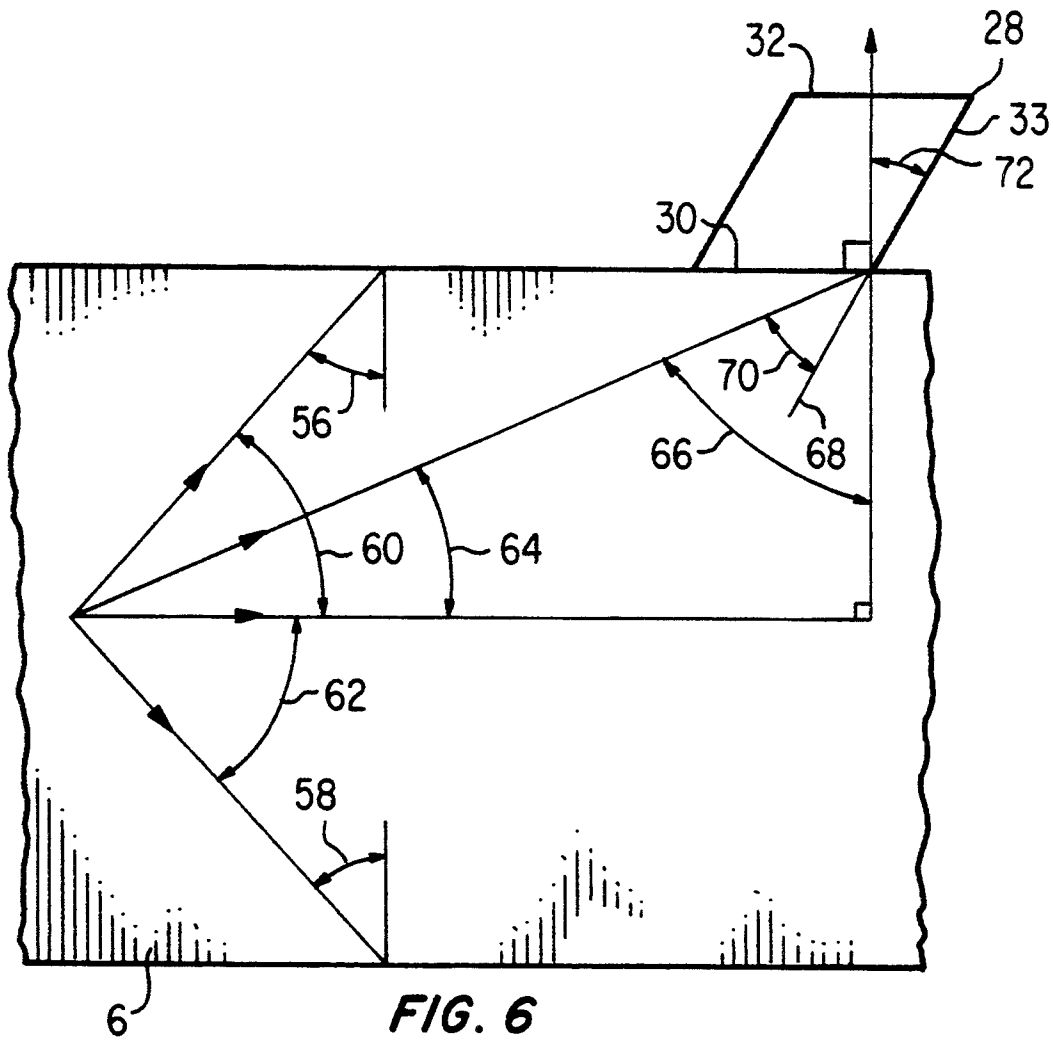


FIG. 6

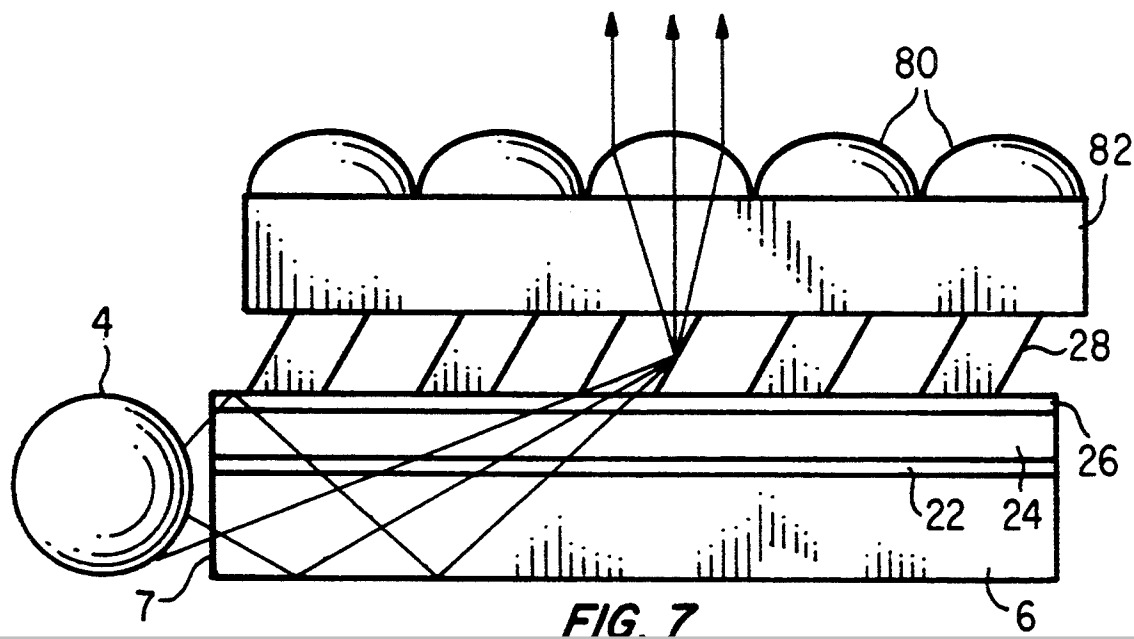


FIG. 7

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