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(54) **LIGHT-EMITTING DEVICES HAVING COPLANAR ELECTRICAL CONTACTS ADJACENT TO A SUBSTRATE SURFACE OPPOSITE AN ACTIVE REGION AND METHODS OF FORMING THE SAME**

Publication Classification(51) **Int. Cl.⁷** **H01L 27/15**(52) **U.S. Cl.** **257/79**(57) **ABSTRACT**(76) Inventor: **Gerald H. Negley**, Carrboro, NC (US)

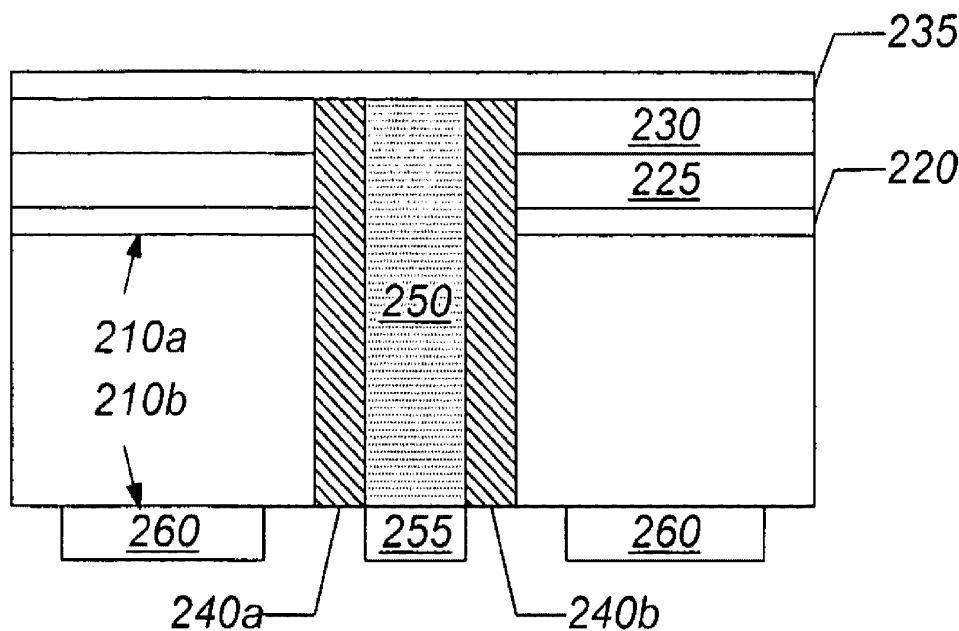
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A light-emitting device includes a substrate having first and second opposing surfaces. An active region is on the first surface and first and second electrical contacts are adjacent to the second surface and are conductively coupled to the active region. In other embodiments, a light-emitting device includes a substrate having first and second opposing surfaces. An active region is on the first surface and includes a first active layer having a first conductivity type on the first surface and a second active layer having a second conductivity type on the first active layer. A first electrical contact is adjacent to the second surface. A contact plug extends through the substrate and the active region and couples the first electrical contact to the second active layer. A second electrical contact is coupled to the substrate at the second surface.

(21) Appl. No.: **10/818,592**(22) Filed: **Apr. 6, 2004****Related U.S. Application Data**

(60) Provisional application No. 60/466,635, filed on Apr. 30, 2003.



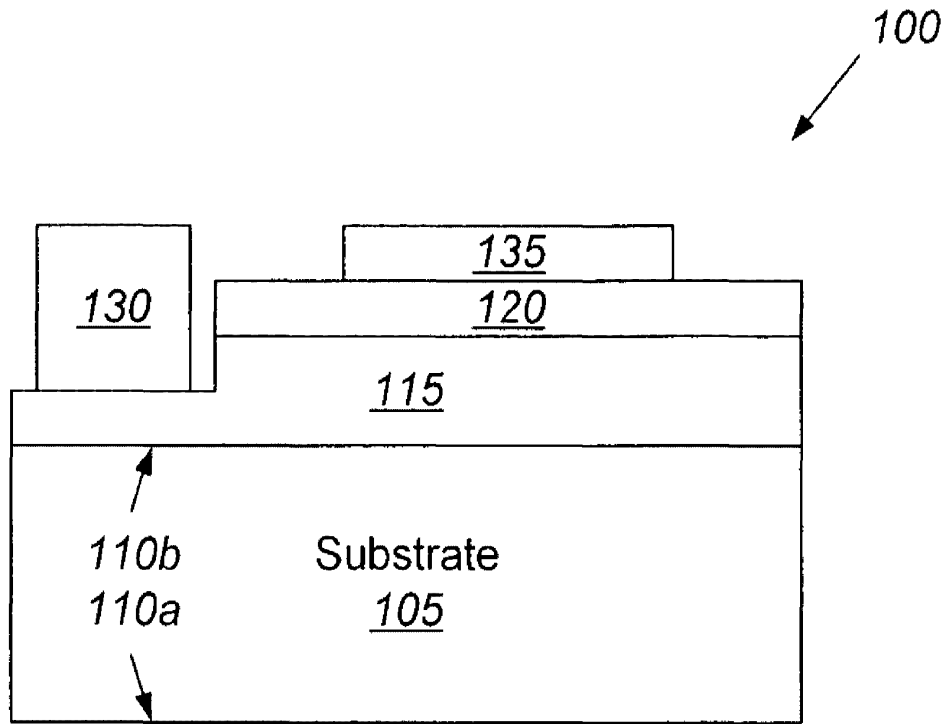


FIG. 1
(PRIOR ART)

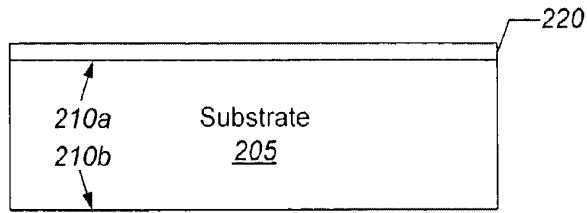


FIG. 2A

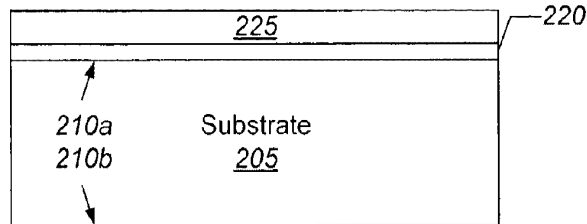


FIG. 2B

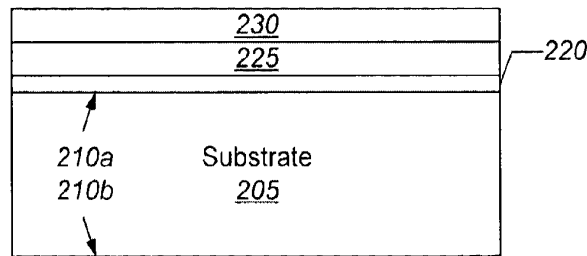


FIG. 2C

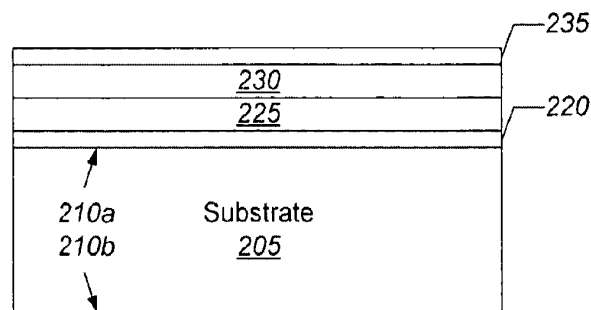


FIG. 2D

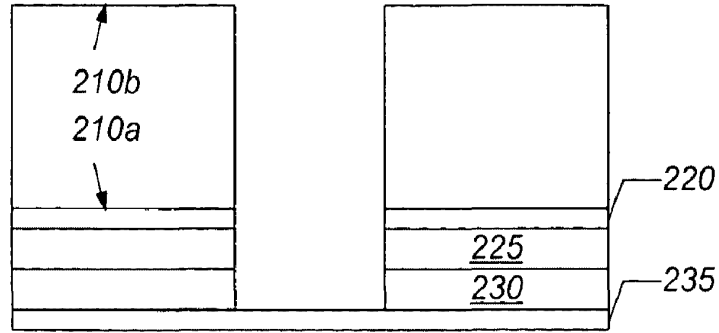


FIG. 2E

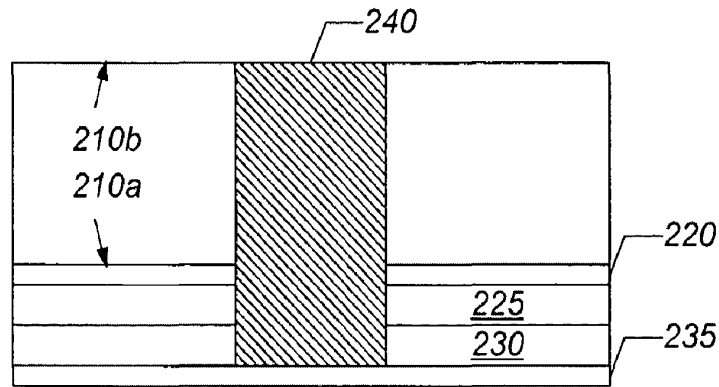


FIG. 2F

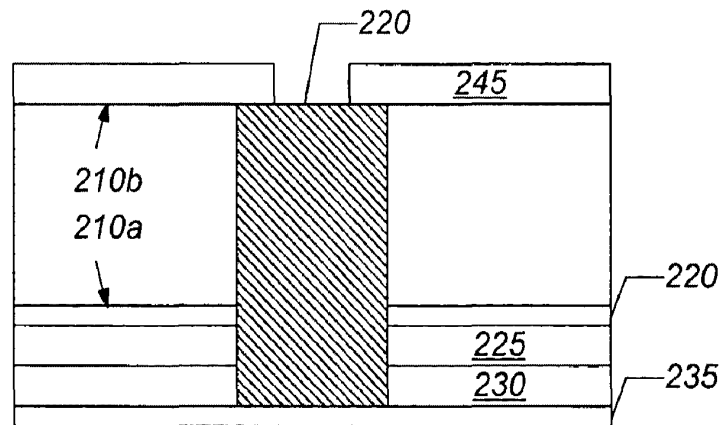


FIG. 2G

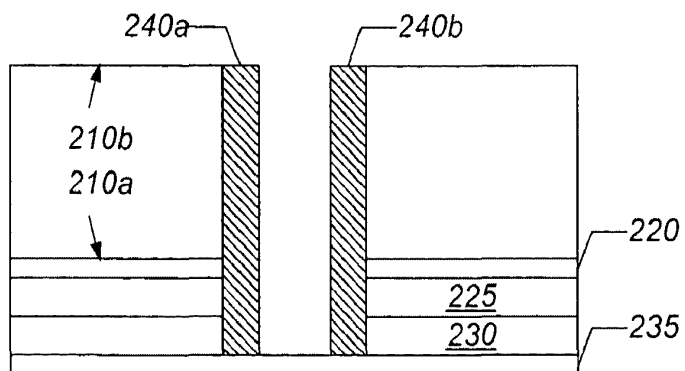


FIG. 2H

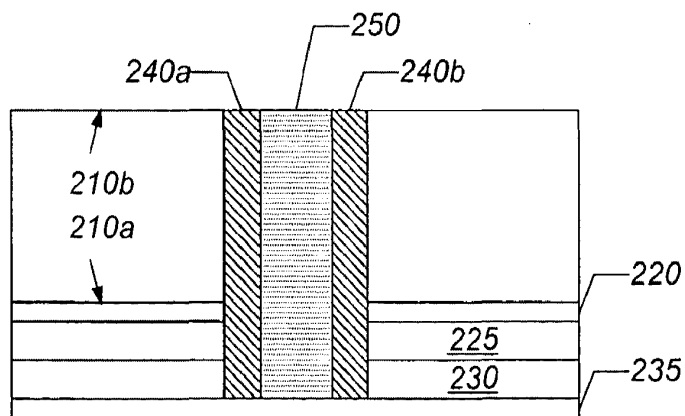


FIG. 2I

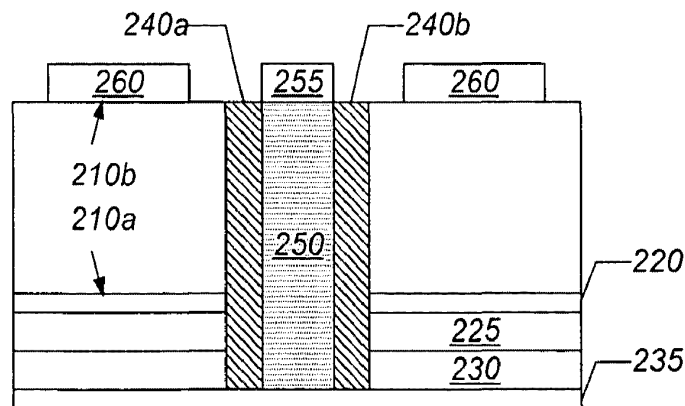


FIG. 2J

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