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Hsu

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(54) **LED PACKAGE AND THE PROCESS MAKING THE SAME**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 56 days.

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(30) **Foreign Application Priority Data**

Jun. 26, 2002 (TW) 91113988 A

(51) **Int. Cl.⁷** **H01L 21/66**

(52) **U.S. Cl.** **438/26; 438/29**

(58) **Field of Search** 438/26, 27, 28, 438/29, 34; 257/98, 99, 100, 79, 81, 787

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,698,866 A * 12/1997 Doiron et al. 257/99
6,670,648 B2 * 12/2003 Isokawa et al. 257/99
6,707,069 B2 * 3/2004 Song et al. 257/79

* cited by examiner

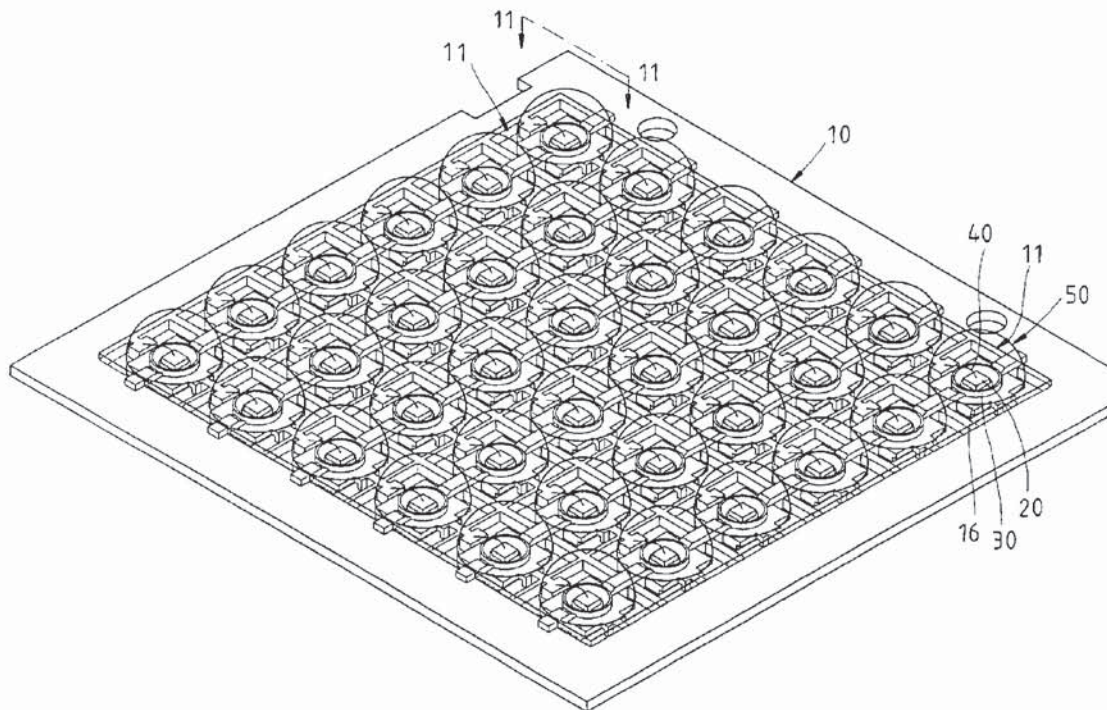
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(57) **ABSTRACT**

The present invention is to provide a process for fabricating light emitting diode (LED) packages. The process begins with a first step of providing a platelike frame having a plurality of cells, each of which is composed of a main plate and a separate arm. Secondly, an LED die and a reflecting ring are respectively mounted on a top surface of each main plate such that the die is located at a center of the reflecting ring. Next, connect a conductive wire between a top surface of the die and a top surface of the separate arm by wire bonding technique. And then, mold a domed transparent encapsulant on each of the cells. The encapsulant encapsulates the die, the reflecting ring and the conductive wire and covers the main plate and the separate arm, and fills a space between the main plate and the separate arm to remain their spaced apart. Finally, cut the frame according to the size of each cell, and then LED packages are obtained.

5 Claims, 8 Drawing Sheets



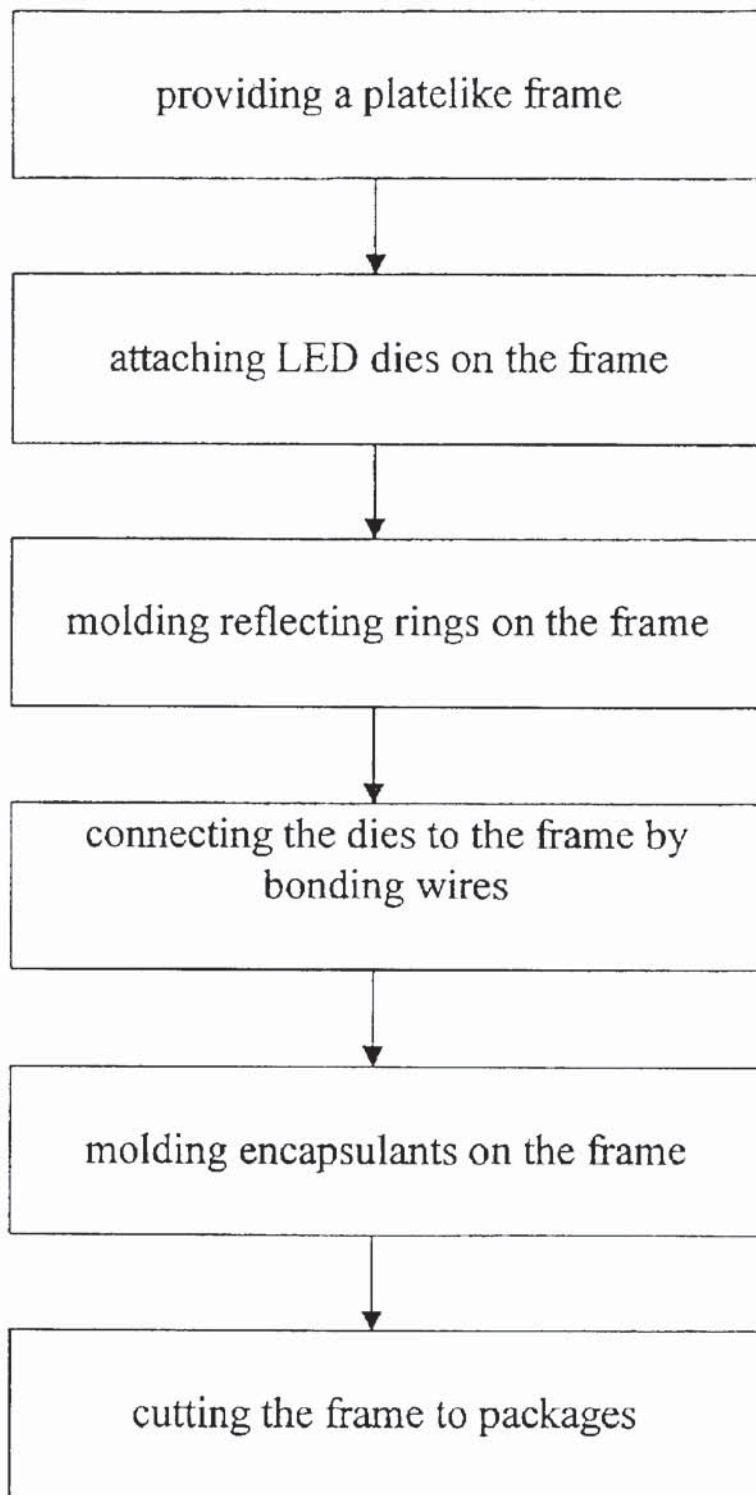


FIG. 1

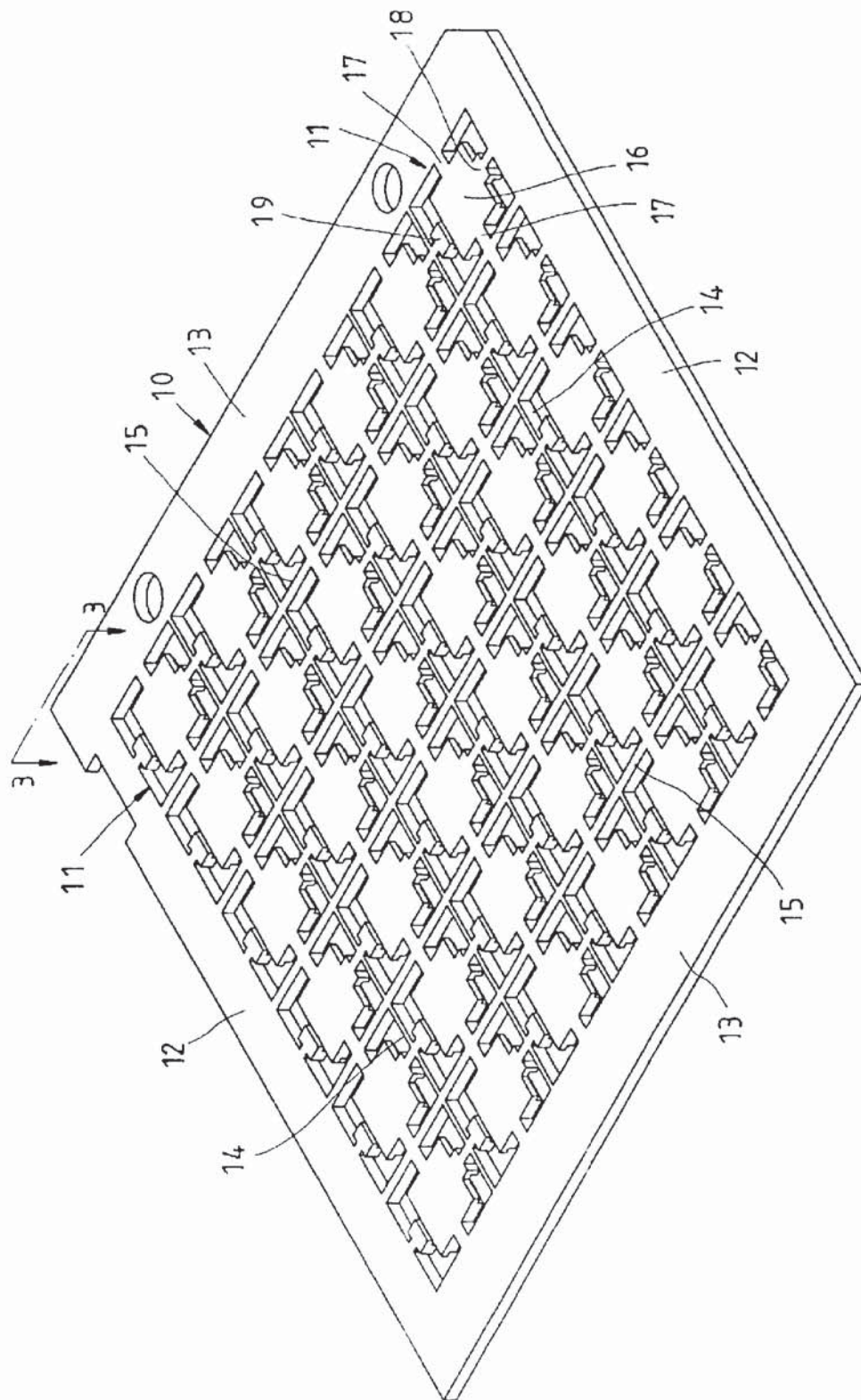


FIG. 2

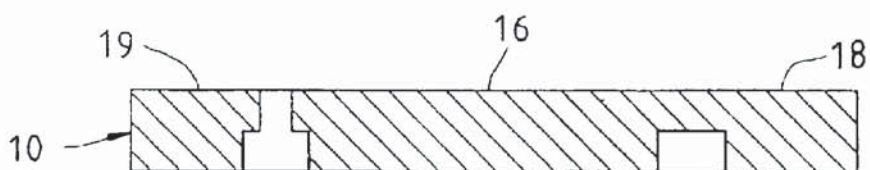


FIG. 3

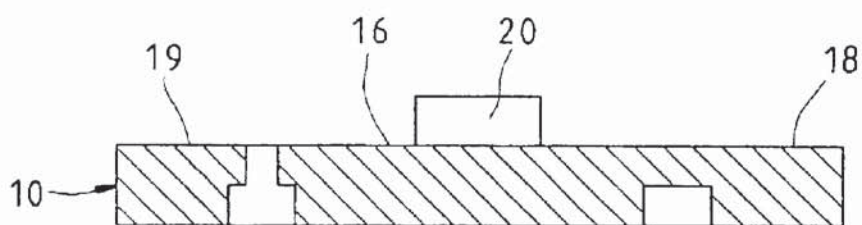


FIG. 5

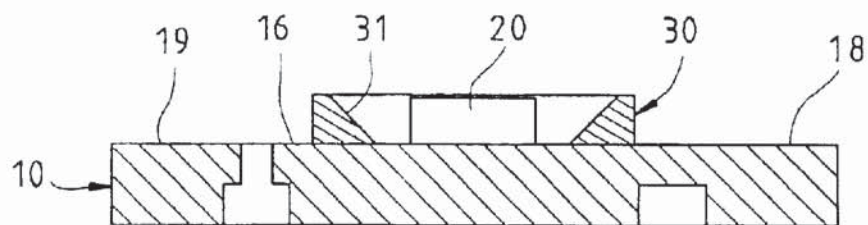


FIG. 7

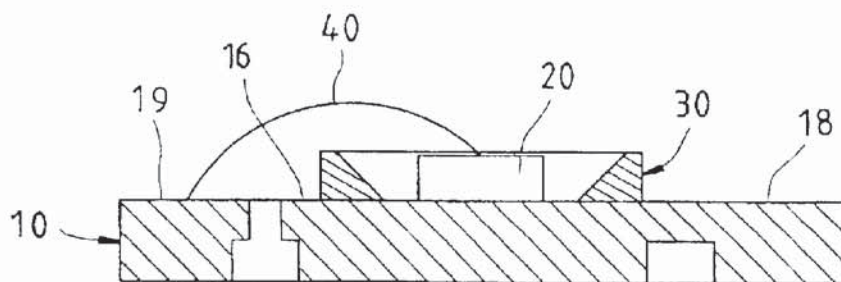


FIG. 9

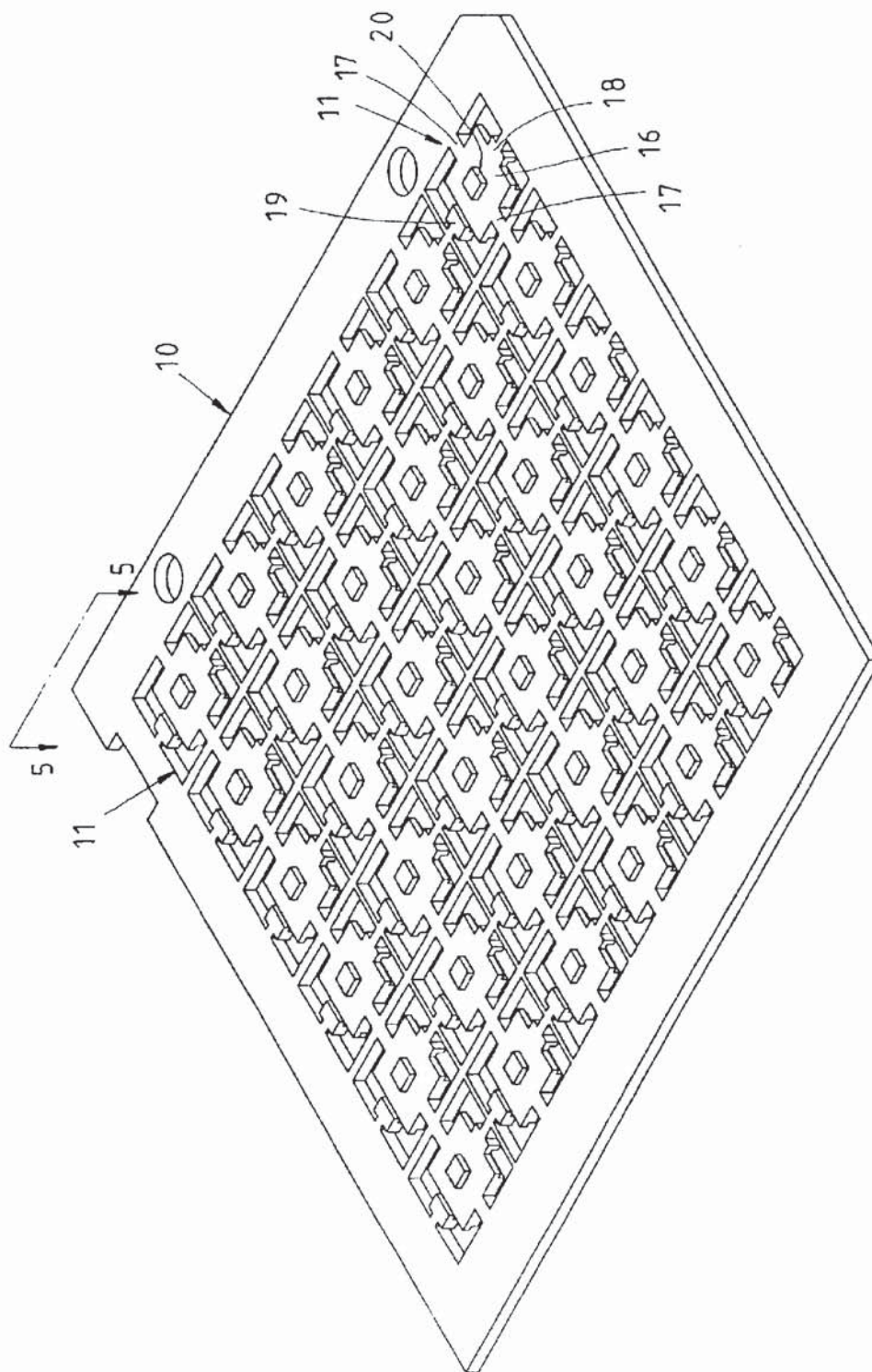


FIG. 4

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