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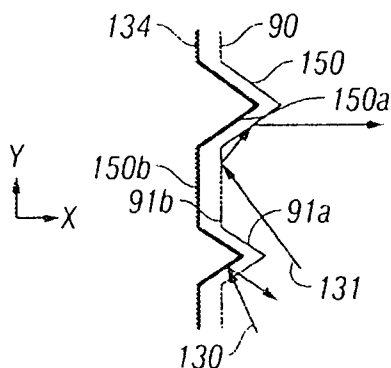
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(54) Title: LIGHT BAR INCLUDING TURNING MICROSTRUCTURES AND CONTOURED BACK REFLECTOR



(57) Abstract: An illumination apparatus includes a light bar, a plurality of indentations in the light bar on a first side of the light bar, and a contoured reflective surface including a plurality of protruding surface portions, such that the surface portions reflect light transmitted through sloping sidewalls of the indentations. The light bar has a first end for receiving light from a light source. The light bar includes material that supports propagation of the light along the length of the light bar. The turning microstructure is configured to turn at least a substantial portion of the light incident on the first side and to direct the portion of light out the second opposite side of the light bar. The protrusions on the contoured reflective surface and the indentations on the light bar can have complimentary shapes and/or aligned in certain embodiments.

# INTERNATIONAL SEARCH REPORT

International application No

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**A. CLASSIFICATION OF SUBJECT MATTER**  
 INV. G02B6/00 F21V8/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 306 609 A (ALPS ELECTRIC CO LTD [JP]) 2 May 2003 (2003-05-02)	1-7, 12-14, 16-30, 35-37, 40-49
Y	paragraphs [0030] - [0052]; figures 1,2,6-8	15,22, 38,39
X	US 2003/012009 A1 (SUZUKI SHINGO [JP] ET AL) 16 January 2003 (2003-01-16)	1,3-14, 16-21, 23,24, 26-37, 40-49
Y	paragraphs [0017] - [0037]; figures 1,2 US 2006/066783 A1 (SAMPSELL JEFFREY B [US]) 30 March 2006 (2006-03-30) the whole document	15,38
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☒ See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2001/010630 A1 (UMEMOTO SEIJI [JP]) 2 August 2001 (2001-08-02) paragraphs [0018] - [0028]; figures 1-3 -----	22, 39

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2007/021375

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1306609	A	02-05-2003	CN 1414418 A	30-04-2003
			JP 4001736 B2	31-10-2007
			JP 2003132724 A	09-05-2003
			KR 20030033997 A	01-05-2003
			TW 571156 B	11-01-2004
			US 2003165054 A1	04-09-2003
US 2003012009	A1	16-01-2003	JP 2003031017 A	31-01-2003
US 2006066783	A1	30-03-2006	AU 2005290101 A1	06-04-2006
			CA 2576177 A1	06-04-2006
			EP 1794646 A1	13-06-2007
			KR 20070056108 A	31-05-2007
			WO 2006036415 A1	06-04-2006
US 2001010630	A1	02-08-2001	JP 2001194534 A	19-07-2001