

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2017/030366

A. CLASSIFICATION OF SUBJECT MATTER
G02B6/02(2006.01)i, H01S3/067(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G02B6/02-6/036, G02B6/10, G02B6/44, H01S3/00-3/02, H01S3/04-3/0959, H01S3/098-3/102, H01S3/105-3/131, H01S3/136-3/213, H01S3/23-4/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2017
Kokai Jitsuyo Shinan Koho 1971-2017 Toroku Jitsuyo Shinan Koho 1994-2017

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP 2001-257422 A (Sumitomo Electric Industries, Ltd.), 21 September 2001 (21.09.2001), paragraphs [0028], [0033] to [0035]; fig. 1, 3, 7 & US 2001/0021210 A1 paragraphs [0058], [0063] to [0065]; fig. 1, 3, 7 & EP 1133036 A2	1, 3-4 2, 5-6
Y	US 2010/0080499 A1 (SAHLGREN et al.), 01 April 2010 (01.04.2010), paragraph [0048]; fig. 2 & US 8218922 B2 & WO 2008/101636 A1 & EP 1962119 A1 & CA 2621783 A1	2

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
01 November 2017 (01.11.17)

Date of mailing of the international search report
14 November 2017 (14.11.17)

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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	JP 2002-6148 A (Sumitomo Osaka Cement Co., Ltd.), 09 January 2002 (09.01.2002), paragraph [0007] (Family: none)	2
Y	JP 2004-109928 A (Sumitomo Electric Industries, Ltd.), 08 April 2004 (08.04.2004), paragraphs [0016] to [0018], [0022], [0025] to [0028]; fig. 1, 4, 6 & US 2004/0109638 A1 paragraphs [0032] to [0034], [0038], [0041] to [0042]; fig. 5, 8, 11 & US 6952511 B2	5-6
A	JP 2011-91107 A (Sumitomo Electric Industries, Ltd.), 06 May 2011 (06.05.2011), entire text; all drawings & US 2011/0090931 A1 entire text; all drawings & JP 5552793 B2 & US 8243768 B2	1-6
A	JP 11-326669 A (Oki Electric Industry Co., Ltd.), 26 November 1999 (26.11.1999), entire text; all drawings & JP 3693494 B2	1-6
A	JP 2007-94350 A (Electronics and Telecommunications Research Institute), 12 April 2007 (12.04.2007), entire text; all drawings & US 2007/0071389 A1 entire text; all drawings & US 7412133 B2 & KR 10-2007-0035913 A	1-6