

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/044576

A. CLASSIFICATION OF SUBJECT MATTER
 Int. Cl. B01J19/08 (2006.01) i, C01B3/06 (2006.01) i, C01B6/04 (2006.01) i,
 H05H1/46 (2006.01) i
 FI: B01J19/08 E, C01B3/06, C01B6/04, H05H1/46 B
 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)
 Int. Cl. B01J19/08, C01B3/06, C01B6/04, H05H1/46

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2020
 Registered utility model specifications of Japan 1996-2020
 Published registered utility model applications of Japan 1994-2020

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/0173641 A1 (HADIDI, Kamal et al.) 24 July 2008, paragraphs [0022]-[0053], [0066], fig. 1-5	1-6 7-8
A		
Y	JP 2008-181710 A (CANON INC.) 07 August 2008, paragraphs [0007], [0021], [0042], [0054]	1-6
Y	JP 2012-188701 A (KANAGAWA ACADEMY OF SCIENCE AND TECHNOLOGY) 04 October 2012, paragraphs [0058]-[0060], [0064], fig. 7, 8	1-6
Y	JP 2016-216780 A (SE CORP.) 22 December 2016, paragraph [0025], fig. 2-B	3, 6
Y	JP 11-333288 A (STANLEY ELECTRIC CO., LTD.) 07 December 1999, paragraphs [0115]-[0118], fig. 20	6

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 27.01.2020	Date of mailing of the international search report 10.02.2020
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INTERNATIONAL SEARCH REPORTInternational application No.
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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.
A	JP 2011-058064 A (NATIONAL UNIVERSITY CORPORATION HOKKAIDO UNIVERSITY) 24 March 2011, paragraph [0031], fig. 2	1-8
A	JP 2011-032131 A (BIO COKE LAB CO., LTD.) 17 February 2011, entire text, all drawings	1-8
A	JP 2017-073375 A (ALPHA CORP.) 13 April 2017, entire text, all drawings	7-8
A	US 2004/0060387 A1 (TANNER-JONES, Jeffrey) 01 April 2004, entire text, all drawings	1-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/JP2019/044576

Patent Documents referred to in the Report	Publication Date	Patent Family	Publication Date
US 2008/0173641 A1	24.07.2008	US 2014/0287162 A1 WO 2008/121173 A2	
JP 2008-181710 A	07.08.2008	US 2008/0173402 A1 paragraphs [0009], [0033], [0063], [0080]	
JP 2012-188701 A	04.10.2012	(Family: none)	
JP 2016-216780 A	22.12.2016	(Family: none)	
JP 11-333288 A	07.12.1999	EP 960914 A1 paragraphs [0121]- [0124], fig. 20	
JP 2011-058064 A	24.03.2011	(Family: none)	
JP 2011-032131 A	17.02.2011	(Family: none)	
JP 2017-073375 A	13.04.2017	(Family: none)	
US 2004/0060387 A1	01.04.2004	WO 2002/046482 A1 EP 1348038 A1 AU 2035802 A ZA 200305088 B	