

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/026646

## A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. H01L21/60(2006.01) i, H01L21/3205(2006.01) i, H01L21/768(2006.01) i, H01L23/522(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)

Int. Cl. H01L21/60, H01L21/3205, H01L21/768, H01L23/522

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 1971-2019  
 Registered utility model specifications of Japan 1996-2019  
 Published registered utility model applications of Japan 1994-2019

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	JP 2017-92078 A (TANAKA ELECTRONICS IND CO., LTD.) 25 May 2017, paragraphs [0001], [0020], [0036]-[0039], [0049], [0055]-[0057], [0102]-[0104], [0106], [0107], [0112]-[0129], [0131]-[0134], fig. 3-7 & US 2017/0125135 A1, paragraphs [0001], [0017], [0045], [0046], [0055]-[0061], [0072], [0078]-[0080], [0125]-[0127], [0129], [0130], [0135]-[0152], [0154]-[0157], fig. 3-7 & CN 107039295 A	1-20
Y	JP 2009-140942 A (NIPPON STEEL MATERIALS CO., LTD.) 25 June 2009, paragraphs [0023], [0036]-[0040], [0042], [0044]-[0049], [0052]-[0057], [0078], [0082], [0083], [0086], [0101], [0102], tables 1, 2 (Family: none)	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

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"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

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"&amp;" document member of the same patent family

Date of the actual completion of the international search  
31.07.2019Date of mailing of the international search report  
13.08.2019Name and mailing address of the ISA/  
Japan Patent Office  
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**INTERNATIONAL SEARCH REPORT**International application No.  
PCT/JP2019/026646

## 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 2018-137487 A (NIPPON MICROMETAL CORP.) 30 August 2018, paragraphs [0008], [0033]-[0036], [0065]-[0069], tables 1-1 to 1-5 & US 2017/0117244 A1, paragraphs [0010], [0046], [0047], tables 1-1 to 1-5 & EP 3121841 A1 & KR 10-2016-0150634 A & CN 106415830 A	2-20