

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2018/031062

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. F25B1/00 (2006.01) i, B60H1/32 (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. F25B1/00, B60H1/32

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 1971-2018
 Registered utility model specifications of Japan 1996-2018
 Published registered utility model applications of Japan 1994-2018

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 | WO 2017/098795 A1 (DENSO CORP.) 15 June 2017, paragraphs [0022]-[0024], [0048]-[0182], [0210], fig. 1, 15 & JP 2017-110898 A & CN 108369042 A | 1-8 |
| Y | JP 2015-183872 A (DENSO CORP.) 22 October 2015, claims, paragraphs [0070]-[0088], fig. 1-5 (Family: none) | 1-8 |
| Y | JP 2008-261603 A (DENSO CORP.) 30 October 2008, claims, fig. 4 (Family: none) | 1-8 |
| Y | JP 2000-002468 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 07 January 2000, claims, paragraph [0010] (Family: none) | 1-8 |

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

* Special categories of cited documents:

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| “A” document defining the general state of the art which is not considered to be of particular relevance | “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 |
| “E” earlier application or patent but published on or after the international filing date | “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 |
| “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) | “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 |
| “O” document referring to an oral disclosure, use, exhibition or other means | “&” document member of the same patent family |
| “P” document published prior to the international filing date but later than the priority date claimed | |

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| Date of the actual completion of the international search 05.11.2018 | Date of mailing of the international search report 13.11.2018 |
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| Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan | Authorized officer Telephone 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. |
|-----------|---|-----------------------|
| Y | JP 2003-166764 A (DENSO CORP.) 13 June 2003, claims, fig. 7-9 & US 2003/0051494 A1, claims, fig. 7-9 & DE 10243374 A1 | 1-8 |
| Y | JP 2004-101143 A (DENSO CORP.) 02 April 2004, claims, fig. 1-5 (Family: none) | 1-8 |
| Y | US 2010/0064700 A1 (GM GLOBAL TECHNOLOGY OPERATIONS, INC.) 18 March 2010, paragraph [0029], fig. 1, 7A-7B & DE 102009040796 A1 & CN 101672557 A | 1-8 |
| Y | JP 2001-208435 A (SANYO ELECTRIC CO., LTD.) 03 August 2001, claims (Family: none) | 1-8 |
| A | WO 2012/118198 A1 (SANDEN CORP.) 07 September 2012, entire text, all drawings & US 2015/0040594 A1 & US 2016/0375743 A1 & US 2017/0028815 A1 & US 2017/0028816 A1 & US 2017/0028817 A1 & US 2017/0080777 A1 & CN 103534539 A & CN 104972866 A & CN 105020920 A & CN 105150796 A | 1-8 |
| A | JP 2015-101180 A (DENSO CORP.) 04 June 2015, entire text, all drawings & US 2016/0297283 A1 & WO 2015/075872 A1 & CN 105764727 A | 1-8 |
| A | WO 2015/111379 A1 (DENSO CORP.) 30 July 2015, entire text, all drawings & JP 2015-137778 A | 1-8 |
| A | JP 2009-047389 A (DENSO CORP.) 05 March 2009, entire text, all drawings (Family: none) | 1-8 |